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COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
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Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Chief, Branch of Market News, Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington 25, D. C.

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COMMERCIAL FISHERIES REVIEW

November 1959 Washington 25, D.C. Vol. 21, No. 11

SHRIMP EXPLORATION BY THE M/V OREGON ALONG THE NORTHEAST COAST OF SOUTH AMERICA [1/]

By H. R. Bullis, Jr.* and J. R. Thompson**

SUMMARY

Two cruises of the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon were made, during the fall of 1957 and the late summer of 1958, off the Northeast Coast of South America. The primary objective was to obtain preliminary data on the shrimp resources of that region. The first cruise covered the general region extending from Trinidad to the mouth of the Amazon River, and the second cruise was largely devoted to a more detailed investigation of a smaller area off the coasts of British Guiana, Surinam, and French Guiana.

Commercial quantities of pink shrimp were found off the Guianas with optimum catches near the 30-fathom curve. The best night's fishing resulted in 576 pounds (heads-on) 6-10 count pink shrimp, off the Surinam River, obtained by dragging two 40-foot flat trawls simultaneously.

Brown shrimp were less common and scattered. Best catches amounted to 30 to 40 pounds (heads-on) per one-hour drag. Sea bobs were prevalent in waters shallower than 16 fathoms.

Fig. 1 - The U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon.

Only small amounts of deep-water shrimp species were taken, although three species, royal-red shrimp, "scarlet" shrimp, and Solenocera vioscai, were found to inhabit the entire deep-water region.

Limited quantities of small red snapper were found in 31 percent of the drags made inside 50 fathoms. Lane snapper and a variety of other fishes, including sea catfish, sea trout, and croaker-like species, were also found in abundance in shallow waters.

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1/ A condensed version of this report appeared in The Fish Boat, July 1959.

Good trawling bottom is present in most areas of the coast out to the 50-fathom curve. The bottom generally consists of soft mud out to 20-25 fathoms and a mixture of mud and sand from 25 to 50 fathoms. Beyond 50 fathoms an extensive zone of rough coral and rock bottom extends, in many localities, to the edge of the continental shelf.

BACKGROUND

The long-range operating capability and over-all efficiency of the shrimp fleet of the Gulf and Southeastern States has been steadily increasing in recent years, as has the number of vessel units involved. Up to the present time, with few exceptions, this dual increase in fishing power has been absorbed by the present established fishery on previously delimited fishing grounds. Many vessel operators have expressed alarm over what they term the "excessive fishing pressure" exerted on the grounds by these factors and have sought ways of easing the situation. One way of alleviating that pressure seemed to lie in the discovery of new shrimp grounds. By 1957, however, most trawlable areas of the continental shelf along the Gulf and southeastern United States coasts, in waters of less than 25 fathoms, had been explored for shrimp by Federal, state, or commercial vessels. There seemed little indication that extensive new areas would be added following the discovery of the Tortugas (Idyll 1950) and Campeche pink-shrimp beds. It thus became clearly apparent that, if new shrimp beds were to be found, exploration must be conducted outside the present range. The lessening importance of previously-imposed limitations of time and distance, brought about by increased range and working ability of modern vessels, made such a step practicable. Exploratory fishing, outside the existing commercial range, can take two forms; vertical and horizontal extension.

Work in the Gulf of Mexico and off the southeast coast of the United States by the U. S. Bureau of Commercial Fisheries extended vertical exploratory and production-type shrimp coverage out to depths of roughly 180-350 fathoms, using Bureau owned and chartered vessels Oregon, Pelican, Combat, and Silver Bay. That work resulted in the discovery of a new potential, the royal-red shrimp (Bullis 1956, Bullis and Rathjen 1959).

Geographically, the waters over the continental shelf of the northeast coast of South America, roughly from Trinidad to the Amazon River, constitute a vast region which has received, at best, only meager shrimp investigation. Accounts of the limited surveys that had been made in restricted areas off the Amazon River and the Guianas varied, and, in most cases, could not be traced. The U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon therefore completed two cruises in international waters off this coast to obtain preliminary information on possible shrimp resources. Oregon cruise 47, made in the late fall of 1957, covered the region from Trinidad to the Amazon Delta with 113 exploratory drags. A total of 71 drags was made in the 10- to 100-fathom-depth range and 42 drags were made in 100- to 400-fathom depths.

Table 1 - M/V Oregon South American Exploration--Distribution of Trawl Drags by Depth

Depth Interval	No. of Drags
Fathoms	
0- 50	218
51-100	21
101-150	22
151-200	14
201-250	10
251-300	6
301-350	3
351-400	1

The work carried out on cruise 53, during the late summer of 1958, was more restricted in depth and area, and it extended from Trinidad to the coastal waters of Cayenne, French Guiana, with major emphasis on explorations off the coast of the Guianas. Ninety percent of the 182 drags were made in water of less than 50 fathoms.

The number of drags made in various depths during both cruises is show in table 1. Figure 2 shows the location of the drags made during both cruises.

GEAR AND FISHING METHODS

Most of the trawling was carried out with 40-foot-flat shrimp trawls, using either bracket or chain doors on 15- to 25-fathom bridles. Tickler chains were used during most of the work on the second trip with encouraging results. A single trawl was used for most exploratory dragging, but double-trawl rigs also were operated in a few areas to more closely tie in the results with accepted Gulf of Mexico commercial trawling practices. Larger trawls, varying from 65 to 100 feet in headrope size, were also tried; but resulting catches did not compare favorably with catches made with two 40-foot nets towed simultaneously on the same grounds, and use of the large nets was discontinued.

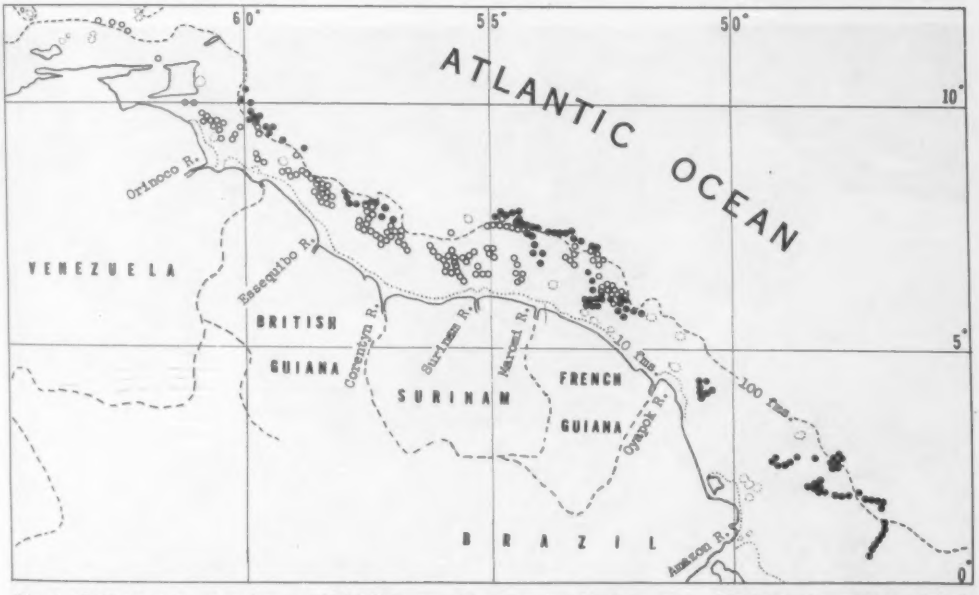

Fig. 2 - Exploratory trawling drags by the M/V Oregon off northeastern South America. Black dots show positions fished on first cruise. Circles, positions on second cruise.

During exploratory trawling it was noted that length of drag resulted in a noticeable change in catch rate. Although the varying trawling conditions did not allow proper statistical evaluation of the catches, the rates from one-, two-, and three-hour drags, in most cases, showed a marked shrimp-catch increase per hour between the one- and three-hour drags. This, presumably, might result from the length of time it took the net to reach a "stabilized" fishing position.

The amount of warp used in relation to water depth was not constant, as strong and variable currents necessitated constant drag-to-drag modifications of this factor.

FISHING CONDITIONS

Current created the most important trawling problem encountered. Strong currents occurred in the more desirable fishing depths, between the 20- to 40-fathom curves. Conditions were poorest off Cayenne, where estimated current speeds of 5 to 6 knots permitted only countercurrent dragging. In spite of promising signs of shrimp in the Eastern French Guiana area, time did not permit an adequate solution to the problem of trawling in the strong current.

Sea and weather conditions during both cruises were favorable for shrimp trawling; and information received from authorities in Surinam indicates that heavy seas, which would stop fishing activities, are infrequent. The period of worst weather extends from January through March, when the fresh to strong northeast trade winds are said to blow continuously.

Bottom types varied from area to area, but generally conformed to soft mud inside of 20 to 25 fathoms; sand, mud, and broken shell out to 50 or 60 fathoms; and rock, coral, gravel, and sand extending from there to the limits of the continental shelf. Occasional patches of hard bottom were encountered in the more desirable shrimp ranges (inside of 50 fathoms), but the entire range was, for the most part, trawlable. During the extensive work carried out during cruise 53, no gear was lost due to bad bottom.

Fig. 3 - Sorting out the shrimp from a trawl catch off the Surinam coast aboard the M/V Oregon.

Shore facilities for taking on ice and fuel, and for freezing and storing the shrimp catches are, at present (1959), not sufficient to withstand the sudden influx of a large fleet. Surinam, British Guiana, and Trinidad are presently increasing their capacities in this direction, and all three, in addition to Cayenne, French Guiana, would make suitable bases for shrimp operations if future developments substantiate the indications of a potentially large, year-round fishery.

FISHING RESULTS

PINK SHRIMP: The South American pink shrimp (Penaeus brasiliensis), is very closely related to the pink shrimp of the southern United States, P. duorarum. Pink shrimp represented the largest commercial potential observed during the two cruises. The species was found over a broad area extending from Venezuela, along

the Guianas, to the Brazilian coast north of the Amazon River, in waters ranging in depth from 16 to 50 fathoms. While apparently not present in the dense concentrations which marked the early Campeche shrimp fishery, the pink shrimp, nevertheless, seemingly, could provide the basis for a steady, year-round fishery. Local authorities have noted that there is apparently little seasonal variation in catch rate, but they believe that additional work on a year-round basis is desirable to verify this.

Best Oregon catch rates were obtained in close proximity to major drainage systems of the coast; the Orinoco, Essequibo, Corentyn, Surinam, and Maroni River systems. The areas off the Oyapok and Amazon Rivers were not sufficiently explored to determine their importance. Catch rates in areas extending out from these drainages averaged two to four times as large as in the intermediate areas.

Fig. 4 - Pink shrimp from the Guianas. These shrimp averaged 16-20 count, heads-off.

Best fishing was found as the 30-fathom curve was approached, and shrimp catches dropped sharply on either side of this depth. Almost all catches were composed of medium to large (21-25 to 6-10 count[1/]) shrimp. A general tendency toward increase in size of individual shrimp with increasing depth was noted. From 16 to 25 fathoms, catches of less than 10 pounds of 21-25 and 16-20 count shrimp per hour were usual; whereas in the depths between 25 and 35 fathoms, the average for all exploratory drags rose to over 20 pounds per hour of mostly 16-20 count shrimp. In the latter depth range, in three areas--off the Essequibo, Surinam, and Maroni Rivers--nightly catch rates using two 40-foot flat trawls usually amounted

1/Counts represent the number of heads-off shrimp per pound.

to about 500 pounds of heads-on shrimp (16-20 count). The best night-long catch was off the Surinam River when 576 pounds (heads-on) of 6-10-count pink shrimp were landed. In 45 to 50 fathoms only small numbers of large (6-10 count) female shrimp were caught.

In general the pink shrimp grounds, from the Orinoco to the Oyapok Rivers, afforded good trawling bottom consisting chiefly of a mixture of mud and sand. Small patches of coral and sponge were occasionally encountered, but gear damage was slight, as those areas were easily detected on the depth recorders. The bottom in most areas changed character in waters deeper than 50 fathoms and became considerably rougher; however, pink shrimp were apparently absent, or only infrequently met with, in the deeper area. Inside 10 to 15 fathoms, the great quantity of industrial fish interfered with shrimping operations. The best trawling grounds, thus, correspond well with the highest observed pink-shrimp concentration. The shrimp grounds extend quite far from the coastline. The position of the 20-fathom curve lies from 20 to 35 miles offshore, in most cases.

Fig. 5 - Removing heads from shrimp preparatory to boxing and freezing.

As in the Gulf of Mexico, pink shrimp catches fell off at, or before, daylight; and daytime trawling was unproductive for this species. Major attention was, therefore, focused on fishing from late afternoon to dawn.

While it is probable that the pink shrimp grounds have been roughly delimited by these cruises, considerable additional work would be necessary to accurately define the boundaries of the most productive fishing areas.

BROWN SHRIMP: Sporadic catches of brown shrimp (Penaeus aztecus), were made at widely scattered points along the Northeastern South American coast. Brown shrimp were included in Oregon drags over a total depth range extending from 10 to 50 fathoms, although beyond 40 fathoms the quantity caught was considerably less. In the 25- to 30-fathom range they were frequently taken along with pink shrimp. In contrast to the catch rates for brown shrimp in United States waters, the catch rates for brown shrimp along the South American coast did not show any marked fluctuation between day and night catches. They were found predominantly on muddy bottoms. Best catches amounted to 30 to 45 pounds per hour (heads-on) with a 40-foot flat trawl off the coast of British Guiana. The largest night-long catch of brown shrimp was made in 28 to 30 fathoms off the Essequibo River when about 325 pounds (heads-on) were caught mixed with about 175 pounds (heads-on) of pink shrimp. In size, the brown shrimp ranged from 56-60 to 16-20 count, averaging about 26-30 count.

SEA BOBS AND MISCELLANEOUS SMALL INSHORE SHRIMPS: Very little exploration in less than 10 fathoms was made by the Oregon due to time limitations and the earlier indications of offshore concentrations of brown and pink shrimp.

The sea bob (Xiphopeneus kroyeri), forms the basis of a very important local fishery in Surinam. It is caught locally by means of set nets suspended from stakes in the river mouths. Sea bobs apparently are seasonally available in vast quantities, in the estuarine areas and coastal regions, out to a depth of approximately 15 fathoms. The major portion of the present production is dried and packaged for export. A small number are headed, hand-peeled, and frozen at Paramaribo. The Oregon obtained catches of sea bobs over a depth range of 7 to 15 fathoms. The prevalence of large quantities of "trash," including a high percentage of such undesirable elements as jellyfish, sting rays, and saw fish, might cause a sea-bob trawl fishery to meet with serious drawbacks.

Fig. 6 - Washed shrimp tails being packed in 5-pound freezer cartons.

A few other shallow-water shrimp species are present in the region and are utilized to some extent as a source of dried shrimp. These, however, are even smaller than the sea bob, varying in size from 100 to 500 (heads-on) shrimp to the pound. In this group are included Hippolysmata sp. and Palaemon sp. One Oregon drag resulted in 130 pounds of the two small shrimp species. Apparently these forms are most concentrated in the areas around large river mouths. Oregon catches of the small shrimp known locally as "fine shrimp," were made along the Brazilian coast off Maraca Island at the mouth of the Amazon River and off the Surinam River.

Fig. 7 - Storing the boxed shrimp in one of the Oregon's 15-ton freezers.

Penaeus schmitti: Similar to its counterpart (P. setiferus) in the Gulf of Mexico and southeastern United States, the South American P. schmitti is closely restricted to shallow-water areas and is an inhabitant of the bays and estuarine regions that were inaccessible, for the most part, to the Oregon. Small amounts of these shrimp were taken at four Oregon stations in 15 to 26 fathoms. This species apparently is commonly found in the tilapia culture ponds of Surinam where it reportedly reaches a large size. It is known locally as a white or blue shrimp and has the general appearance of the white shrimp common to southeastern United States coastal areas except that it has a purple "tail."

Deep-Water Shrimp: The previously-mentioned shrimp are considered shallow-water or coastal in relation to a second group of deeper, offshore dwellers. The two groups are more or less sharply separated by a band lying between 50-60 fathoms and 85-100 fathoms, in which few shrimp of any commercial, or potential-

ly-commercial, importance have been found. Among the numerous species of shrimp inhabiting the deeper waters, three stand out as possible commercial resources: Solenocera vioscai, Plesiopenaeus edwardsianus, a large scarlet shrimp; and Hymenopenaeus robustus, the royal-red shrimp.

Solenocera vioscai were found over a range of from 95 to 160 fathoms. Only subcommercial catches were found during the present explorations with best catches running from 6 to 10 pounds (heads-on) per one-hour drag. The area of greatest concentration, as found by these limited explorations, was off the Surinam coast within the depth range mentioned. These shrimp averaged around 55-60 count.

Few royal-red shrimp were taken, although the stations made in the royal-red shrimp depth range (roughly 185-350 fathoms) pointed to the existence of that species along the entire coast. The best catch occurred north of Trinidad in 185 to 200 fathoms. A total of 75 pounds (heads-on) of large 16-20 count royal-red shrimp was taken in a one-hour drag with a 40-foot shrimp trawl on a blue-mud bottom in that area.

Plesiopenaeus edwardsianus, large deep-water scarlet shrimp, were taken in small amounts over a total depth range extending from 185 to 400 fathoms. Best catches were made in the 300- to 400-fathom range where catch rates ranged from 10 to 25 pounds (heads-on). This species is an active swimmer and it is likely that the standard flat trawl with its relatively low vertical opening is not suited to cope with a species displaying this ability.

FISH: Small numbers of red snapper (Lutianus aya) and lane snapper (L. synagris) were taken in shrimp trawls along the entire coast within a depth interval of 15 to 52 fathoms. Thirty-one percent of the stations occupied within that depth range included small catches of red snapper. Average snapper catches ranged from two and one-half to three pounds, with individual fish ranging generally from one-half to two pounds. Largest single catch was 20 pounds.

Lane snapper were present in 29 percent of the drags made within the same depth range. Catches and individual fish weights closely paralleled those given for red snapper.

The presence of snapper in this percentage of shrimp-trawl drags indicates commercial possibilities on neighboring rough bottom where shrimp trawls cannot be used. Sporadic local attempts have been made in the past to develop a snapper fishery along the coast; but lack of continuing interest, lack of experienced personnel, and lack of suitable vessels interfered with most previous trials. An active snapper fishery has been in existence off British Guiana for some time.

Miscellaneous fish species caught in the shrimp trawls included several marketable varieties. Sciaenids, so far unidentified as to species, were common. They included croaker-like fishes that averaged about one pound, and sea trout that weighed from 2 to 4 pounds.

Spanish mackerel were observed along the coast of British Guiana in surface schools over the 20- to 40-fathom range. On a few occasions, while working that section of the coast, Spanish mackerel were caught in the shrimp trawls.

Depth recorder traces of several other schooling species were observed. Identity of the school components was checked by trawl catches and they included; thread herring (Opisthonema), scad (Decapterus), Spanish sardines (Sardinella), and several species of anchovies.

CONCLUSIONS

The work carried out by the explorations has established the fact that marketable shrimp species of valuable sizes are found over most of the coastal region of Northeastern South America, and that concentrations appear in several broad areas. Additional exploration will be required before the areas of highest production can be precisely delineated.

Pink shrimp constituted the most important species found, from a commercial standpoint, with brown shrimp and P. schmitti secondary. Since the basic objective of these trips was of an exploratory-survey nature, and the area that was involved was large, intensive work in any restricted region within the time allotted was precluded. The results obtained should, therefore, be reviewed with the thin exploratory coverage necessarily accorded the area in mind. The possibility exists of heavier concentrations, particularly of pink shrimp, on yet-to-be-discovered grounds.

The major trawling problems include a strong and variable current over most of the trawling grounds, and the general unfamiliarity with bottom conditions.

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CONSUMERS SPEND ONE-FOURTH OF FOOD DOLLAR "AWAY FROM HOME"

Did you know that an increasing share of the nation's food is being marketed by "away-from-home" food-service establishments? These include restaurants, in-plant cafeterias, hotels, schools and colleges, and a number of other types of eating places. According to a recent report issued by the U. S. Department of Agriculture in 1959, about one-fourth of the consumer's food dollar, on the average, is spent for food served away from home.

The Agriculture report is based on a survey of operating policies and practices of some leading institutional wholesalers who are suppliers of food-service establishments. This study analyzes some of the many changes that are under way or can be initiated by the wholesalers to make their operations more effective and more profitable by reducing costs.

A free copy of the report is available from the U. S. Department of Agriculture, Office of Information, Washington 25, D. C. It is Market Research Report No. 335, "Policies and Practices of Some Leading Institutional Wholesale Grocers."

INFLUENCE OF VESSEL-HANDLING PRACTICES ON FORMATION OF BLACK SPOT IN SHRIMP[1/]

ABSTRACT

Handling practices were observed aboard commercial shrimp boats fishing in the Dry Tortugas and the Campeche areas. Experiments were designed to test the effect of a number of factors on the incidence and amount of black spot on shrimp during storage. The factors considered were: (1) length of drag, (2) washing shrimp on deck, (3) bruising shrimp, (4) removal of heads, (5) delay in icing, (6) method of icing, (7) type of ice, and (8) position in storage pen. All shrimp were stored in ice except for a small portion of each sample which was held in frozen storage for 8 to 12 months to test the effect of this factor on incidence of black spot.

Delay in icing the shrimp below deck markedly increased incidence of black spot. Natural variation in the pattern of black-spot development and difficulty in separating the individual effects of the numerous handling factors necessarily present in every test series, tended to obscure the influences of the other factors studied. There were indications that the following factors, alone or in various combinations, tended to increase black spot during storage: (1) long drags, (2) bruising of shrimp on deck, (3) storage of shrimp without washing, (4) storage of shrimp with heads on, and (5) poor icing practices. The type of ice used, the method of icing, position of shrimp in the pen, or frozen storage of shrimp up to a year were not associated with differences in the incidence of black spot.

Black-spot development on shrimp stored in ice cannot be eliminated by improvement in handling practices, but rapid icing and careful handling can reduce the incidence of black spot, and will at the same time maintain quality and prolong storage life of the product.

INTRODUCTION

Black spot on shrimp is a condition characterized by the appearance of black zones or spots usually at the edges of the shell segments. The dark color is produced by melanin pigments which form on the internal shell surfaces or, in advanced stages, on the underlying shrimp meat. These pigments are produced by an oxidative reaction of tyrosinase on tyrosine. The reaction is accelerated by copper and other metallic ions (Bailey and Fieger 1954).

Formation of black spot has been observed on all species of shrimp landed from waters contingent to North America, and probably is a world-wide problem. Observations would lead to the belief that the problem is more severe with some species than with others. The amount of black spot on the shrimp, as landed, largely determines the grade of the shrimp and the price the fishermen receive for their catch. The price for shrimp with considerable black spot may be cut from 2 to 10 cents a pound.

It has been thought that black spot on shrimp develops as a result of poor handling or prolonged storage in ice, but there actually has been little or no investigation of the specific factors that result in the formation of black spot. The purpose of this investigation was to determine whether changes in the way the shrimp are handled on the boats could eliminate or at least reduce the incidence of black spot. Specifically, the objectives of the research were (1) to observe commercial practices of handling shrimp on the boats, and during ice and frozen storage to determine the factors that may affect black-spot formation; and (2) to suggest modification in the commercial methods of handling and storing shrimp in ice to reduce the rate of black spot formation if, in fact, handling practices are associated with formation of black spot.

1/ This research was conducted by the Marine Laboratory of the University of Miami under a contract let by the U. S. Bureau of Commercial Fisheries. Funds were provided by the Saltonstall-Kennedy Act of 1954.

Note: This manuscript was prepared by Charles F. Lee, Fishery Technological Laboratory, U. S. Bureau of Commercial Fisheries, from the final contract report by the research investigators, Clare P. Idyll and James Alexander of the Marine Laboratory, University of Miami, Coral Gables, Fla.

OBSERVATIONS ON COMMERCIAL FISHING PRACTICES

Fishing was observed in two localities: the Dry Tortugas and the Campeche Grounds.

DRY TORTUGAS: Most of the shrimp taken in the Dry Tortugas are landed at Key West, Fla., although smaller numbers of boats may land catches at Marathon, Everglades, Fort Myers, Tampa, and other ports on the west coast of Florida. Most of the trawlers used in this fishery are relatively small, averaging about 50 feet in length, and have noninsulated holds. The gear used is a modified otter trawl. Until recently, most of the boats used a single net. Now many boats use a "double rig" in which two nets are fished simultaneously, one on each side of the vessel.

The average duration of a trip to the Tortugas is about five days. The boats seldom are more than a 10-hour run from their home port. From some ports, the boats may start fishing within 2 hours from the dock. The amount of ice carried is dependent upon the intended duration of the trip. For a 5-day trip, 3 to 5 tons of ice may be carried.

This is a night fishery, and drags may last from 1 to 8 hours, depending on the nature of the bottom, the weather, and the abundance of shrimp. The trawl bag is emptied on deck, and the trawl is reset before the shrimp are sorted from the unwanted material in the catch. This material, usually called "trash," consists of varying amounts of small fish, crustacea, sponges, mollusks, and mud. The ratio of trash to shrimp varies greatly, but in the Dry Tortugas area it is commonly about 2 to 1.

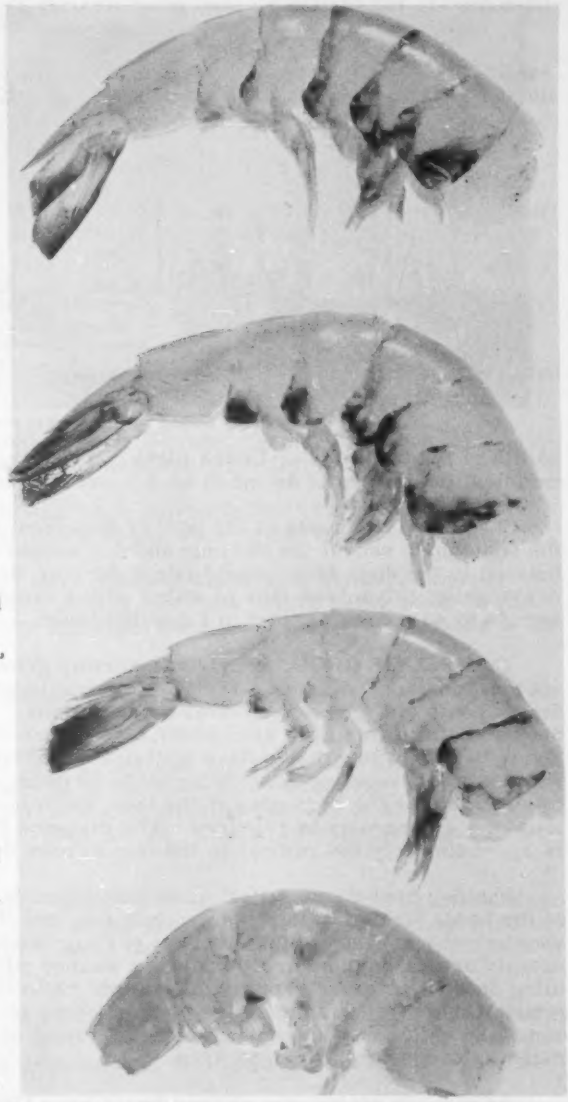

Fig. 1 - Shrimp showing different stages of black spot development. Black spot on the shrimp develops during storage when shrimp are improperly handled on the boats.

Most of the shrimp are "headed" before being iced, but it is not uncommon to ice and bring shrimp to port with heads on, particularly if most of the shrimp are small or if the catch is heavy. It is not the usual practice in this area to wash the shrimp after the heads have been removed. Icing practices are variable. Some fishermen store the shrimp in the hold in baskets covered with a small quantity of ice but most fishermen ice the shrimp in pens. The pen floor is covered with about 6 inches of ice, and more ice is added and mixed with the catch, using a blunt-tined rake.

The promptness with which the shrimp are sorted from the trash, the heads removed, and shrimp iced below decks also varies widely, depending largely on the

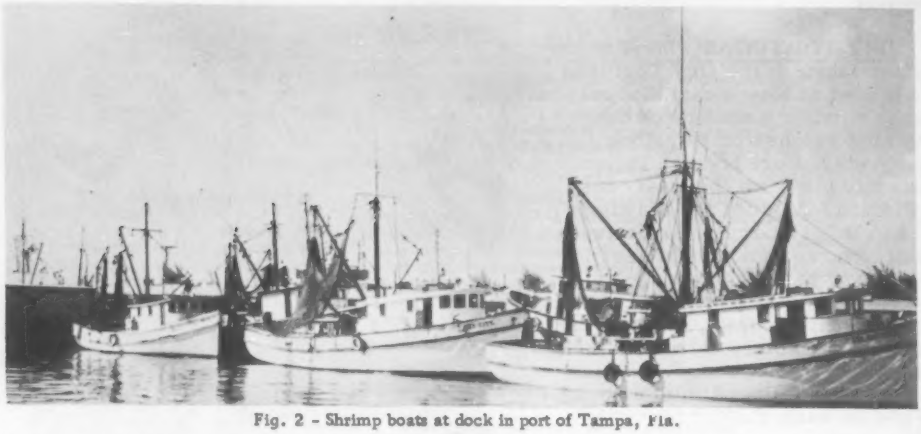

Fig. 2 - Shrimp boats at dock in port of Tampa, Fla.

habits of the fishermen. Under ideal conditions, the shrimp may be iced within 30 minutes, but delays of as much as 4 hours on deck have been observed.

To unload the boats at the port of Key West and at most of the smaller ports, the fishermen shovel the shrimp-and-ice mixture into a large basket, which then is hoisted to the dock and dumped into a de-icer wash tank. The de-icer is simply a rectangular galvanized tank of water with a mesh conveyor belt on one end, which serves to carry the shrimp to a sorting table.

CAMPECHE GROUNDS: Large shrimp grounds are located near Campeche, off the Yucatan Peninsula, Mexico. International waters here are fished by United States boats and those of several other nations. Most of the shrimp taken by United States boats in this area are landed at the port of Tampa, Fla. The boats average about 70 feet in length and have well-insulated holds. The average trip from the Florida west coast may last from 50 to 60 days, and a supply of ice and fuel is taken by the boats at the beginning of the trip, sufficient to last this time. More than 30 tons of ice generally is required. The distance from Tampa to the fishing grounds is approximately 800 miles, so the trip across the Gulf of Mexico takes 3 to 4 days.

Fishing operations differ somewhat from those at the Dry Tortugas area. Most of the boats fishing Campeche grounds now use the double-rig gear. Drags are shorter--rarely more than 4 hours; shrimp heads always are removed; the shrimp usually are muddy and are thoroughly washed with a deck hose to remove mud; handling on deck is more rapid; and a larger ratio of ice to shrimp is used. One factor facilitating more rapid handling of the shrimp on deck is a generally lower amount of trash, which may amount to about one-third of the average catch or about half as much as in the Dry Tortugas area.

As already stated, the shrimp boats near Campeche stay on the fishing grounds for long periods, but most are not equipped to freeze the catch. Consequently, the iced shrimp must be returned to port frequently, usually every five days. This is done by other vessels of the usually large fleet in the area that have completed their trips. These returning vessels fill up their holds with the catch of several other shrimp boats.

The transferring operations usually take place on "The Flats," a shallow area west of the port of Campeche. The vessels whose captains want to send their catch

home transfer the mixture of shrimp and ice from one hold to another in large mesh bags holding about 300 pounds. In the hold of the returning vessel the catches of the different boats are separated by pieces of webbing, and the entire pen loan is capped with a heavy layer of ice. The hold of the returning boat usually is not opened until arrival in port in order to make the ice last longer.

Most of the plants in Tampa use a bucket elevator-conveyor that can be lowered into the boat hold to unload the shrimp. This method of unloading results in less damage to the shrimp than does the use of the shovel-basket hoist.

METHODS AND MATERIALS

The following experimental variations were introduced into the methods of handling and storage of shrimp aboard the boat and in the laboratory to observe their effect on incidence of black spot:

1. Length of drag--observations were made of shrimp taken in drags lasting for 2, 3, 4, 5, and 6 hours.

2. Washing shrimp on deck--a comparison was made with shrimp stored in ice without previous washing.

3. Bruising--some of the shrimp were deliberately bruised on deck, and compared with others of the same lot that were handled carefully.

4. Removal of heads--some shrimp were stored in ice with heads on and compared to others of the same lot from which heads were removed before storage.

5. Delay in icing--observations were made of black spot incidence during storage of lots of shrimp that had been exposed on deck before being iced. A portion of the lot was iced promptly, then other portions were iced after periods of exposure varying from 1 to 6 hours.

6. Method of icing--the usual method of mixing shrimp and ice was compared with icing the shrimp in layers.

7. Type of ice--finely crushed "snow" ice was used on board the boats. However, in one test the shrimp were stored in the laboratory in coarse, medium, and finely crushed ice to determine if particle size affected the rate of black spot formation. In another test, a special aerated ice was compared with the regular non-aerated ice.

8. Position of shrimp in the pen--portions of the catch that had been iced near the front, in the middle, and at the rear of the pen were separated as they were removed from the hold, to observe differences due to pen position on the incidence of black spot during subsequent storage.

9. Frozen storage--a portion of each lot of shrimp was packaged and placed in storage at +5° F. immediately after arrival at the laboratory. Some lots were observed after 4, 8, and 12 months to determine if storage resulted in increased incidence of black spot.

The shrimp used were pink shrimp, Penaeus duorarum, obtained from commercial vessels fishing in the Tortugas and Campeche areas. The experimental samples of shrimp were well-iced in the vessel hold in separate boxes and were iced on the truck en route from Key West or Tampa to the Marine Laboratory in Miami. Only three 10-oz. packages from each sample were frozen for the storage studies. Five to seven pounds of each sample were held for 14 to 17 days in ice in a cool room. A portion of each of the iced samples was removed for evaluation of

black spot every 2 or 3 days. The black spot evaluations were made by experienced laboratory personnel. Ten shrimp were examined and graded for amount of black spot on the basis of five for no black spot and a reduced score as black spot increased. Black spot was evaluated with both shell-on and peeled shrimp, and a permanent photographic record was made of each test lot.

RESULTS AND DISCUSSION

The condition known as black spot, sometimes called melanosis, of shrimp develops during iced storage even under optimum storage conditions. However, it is evident from examination of even a single lot of iced shrimp that black spot does not affect the lot uniformly. Perhaps the most remarkable fact about black spot is that in any given lot of shrimp stored in ice some shrimp will show no more than greyish markings under the segment edges while a few others will be badly discolored with black spot and most will show intermediate stages of discoloration. The reasons for this difference in individual susceptibility to black spot are not known.

Even when the black spot scores for 10 shrimp are averaged, this variability makes it difficult to detect the effect on rate of black spot development of experimental variations in handling practices.

For example, the average initial scores for black spot, rated on arrival at the laboratory 2 to 4 days after the shrimp were caught, ranged from a perfect 5.0 (these are called "pearls" by the industry) to 3.5. On the other hand, after 14 to 17 days of storage in ice the range of black spot scores was only 4.0 to 2.5. Thus some lots of shrimp started out the tests with more black spot than other lots had at the end of the test period. Further evidence of this unaccountable difference from shrimp to shrimp and lot to lot was the observation that frequently the minimum black spot scores were not recorded at the end of the storage test period. Several of these low average scores were recorded on the ninth day, and one on the seventh day after the shrimp were caught.

Factors not subject to experimental control, such as ratio of shrimp to trash, and the amount of shrimp in the trawl may contribute to these irregularities. However, when the normal handling of any trawl load of shrimp involves six or seven of the test variables, it is impracticable to design an experimental series and obtain a sufficient volume of data to permit statistical separation of all these interacting effects. As a result only very strong influences on black spot development, such as delay in icing the shrimp, have an effect which is definitely noticeable, in spite of natural variability and the maze of compensating handling factors.

This should be considered in the following discussion of the effect of each of the handling factors studied on development of black spot.

LENGTH OF DRAG: There was no consistent relationship of length of drag to amount of black spot. Although samples from the 2-hour drags showed less black spot development during subsequent ice storage, the shrimp from the 3- and 4-hour drags showed more black spot than did those dragged 6 hours. However, the 3- and 4-hour drags had a much higher percentage of trash (86 and 93 percent) than the 2- and 6-hour drags (25 and 44 percent). Possibly a heavy load of shellfish, fish, sponge, and other trash in the net may bruise the shrimp and accelerate black spot formation more than the factor of drag time alone.

WASHING: Washing the shrimp on deck did not reduce the amount of black spot significantly as compared to the unwashed samples in these trials. It should be noted, however, that the Tortugas shrimp used in this test had relatively little mud on them.

BRUISING: Deliberate bruising of the shrimp did not definitely increase the amount of black spot. This variable was investigated in combination with the washing studies and variation in length of drag which made it difficult to interpret the results, that is, the individual effects of the various factors could not be separated with the limited amount of data available.

REMOVAL OF HEADS: Shrimp heads are usually removed before the shrimp are iced, except when the shrimp are very small, or catch rate is very heavy. However, when heads were left on the incidence of black spot during storage in ice was not consistently or significantly increased so as to be apparent as a separate effect among the effects of other handling practices.

DELAY IN ICING: The interval from the time the shrimp are removed from the water until they are iced below deck was found to have the most positive relationship of any of the factors studied to the amount of black spot developing during storage. Shrimp that were iced immediately developed the least black spot, and the incidence of black spot increased for other portions of the same net load of shrimp in a direct relation to the time the shrimp were permitted to lie exposed on deck.

Measurement of temperatures at various positions in the piles of shrimp on deck showed some increases at the top of the pile, especially when exposed to the sun. On the other hand, a strong wind caused a drop in temperature initially at the top of the pile due to evaporation. Thus it was not practical to correlate the amount of black spot to position in the pile or temperature of the shrimp.

MANNER OF ICING: No difference in the amount of black spot that developed during subsequent storage could be demonstrated between two methods for icing shrimp in the hold. Most fishermen ice their catch by mixing ice and shrimp. Use of layers of ice and shrimp was equally effective in preserving quality if the layers of shrimp were not more than 3-4 inches thick and ample ice was used to maintain temperatures near 32° F. In either case a heavy layer of ice was first placed over the hold surface.

TYPE OF ICE: Crushed ice of medium size was used to store the shrimp in the laboratory except for two lots. Aerated ice, that is, ice that had been constantly aerated during freezing was used for one lot and in another test three different particle sizes of ice were used during the storage period. No significant difference in the rate of development of black spot was observed.

POSITION OF SHRIMP IN THE PEN: Observations were made of the temperature of shrimp at six positions in the pens in which the shrimp were iced. The temperature of the shrimp was reduced rapidly, from about 70° F. originally to 35°-36° F. within an hour, and reached 32° F. within 4½ hours. Layered icing was slightly more effective in maintaining the shrimp at or near 32° F. regardless of position in the pens. Actual position in the pen showed little effect on shrimp temperature as long as sufficient ice was maintained between shrimp and the rear hold surface and on the top. The pen position had no definite influence on the amount of black spot.

FROZEN STORAGE: Four of the lots of shrimp frozen immediately after arrival at the laboratory were examined after 4, 8, and 12 months' storage. Five of 29 samples showed a slight increase in black spot during this period. Three lots of samples stored for only 8 months showed no increase in black spot during this time.

PEELED SHRIMP: Since shrimp are never peeled on the boats, this was not an experimental variable. However, the shrimp were peeled in the procedure for evaluating black spot, and it was noted that most of the black discoloration was on the inner surface of the shell. Only when black spot was severe, and especially

when the shell had been injured or perforated, was the muscle tissue of the shrimp noticeably discolored.

CONCLUSIONS AND RECOMMENDATIONS

Natural variability in the incidence of black spot, and the fact that it was not practical to test the effect of the various handling practices individually, tended to obscure the effect of all but the very strong influences on black spot. Thus delay in icing of the shrimp was the only factor that showed a consistent and definite correlation to increased incidence of black spot. However, there was evidence in some of the test series that in various combinations long drags, excessive trash in the catch, bruising the shrimp, storage with heads on, failure to wash free of mud, and poor icing practices may increase the incidence of black spot during subsequent storage of the shrimp in ice.

To maintain optimum quality of shrimp on board the fishing vessel and to keep black spot at a minimum during ice storage the following recommendations are made:

1. Keep time of drag short, particularly when fishing in areas where ratio of trash to shrimp is high.

2. Separate shrimp from trash as soon as possible.

3. Remove heads and wash the shrimp free of mud and other extraneous material.

4. Avoid bruising or crushing the shrimp as they lay on deck.

5. Get the shrimp below deck and iced as rapidly as possible after the net has been reset. The shrimp may be iced either in layers or mixed with the ice, but the amount of ice should be adequate to maintain a cover over the hold surfaces and over the top of the pile of shrimp until the catch is unloaded at port.

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HEAVY CROPS OF PONDFISH CHANNEL CATFISH

Pondfish production records are being broken right and left since many U. S. Bureau of Sport Fisheries and Wildlife pondfish hatcheries are now engaging in the production of channel catfish. To be sure, artificial feeding sometimes supplements the natural and induced fertility of the pond water, but production records are still somewhat phenomenal, averaging between 400 and 800 pounds of catfish per surface acre at various stations during the season ended early in 1959.

FISH AND SHELLFISH PURCHASES BY PUBLIC SCHOOLS WITH FOOD SERVICES, 1957-58

By William S. Hoofnagle* and Kenneth E. Anderson*

The U. S. Bureau of Commercial Fisheries has long recognized that school lunchrooms represent one of the large potential outlets for fishery products. A substantial segment of the consumer educational activities of the Bureau has been directed toward the School Lunch Program. Fish-cookery demonstrations for supervisory school-lunch personnel are constantly and systematically being conducted by Bureau home economists and marketing specialists in all sections of the country. These efforts and effective industry follow-up have, in large part, contributed to increasing use of fishery products by schools for lunch programs.

--Editor's Note

BACKGROUND

The outlet for food in schools is an important segment of the away-from-home institutional eating market. Further expansion is likely to occur in this outlet as school enrollments continue to rise and as new schools are built with modern cooking and cafeteria facilities.

Through the school-lunch outlet, a medium is provided whereby new or improved foods may be introduced on a nationwide basis. In addition, children participating in lunch programs are exposed to new foods or familiar foods in new form, learning at the same time how to select well-balanced meals and the importance of good eating habits.

Fig. 1 - School lunchrooms are a large potential outlet for fishery products.

School food service is widely recognized by educators and school administrators as an important part of the school program. Today, there are approximately 60,000 of the 106,000 public schools in the United States offering some type of food service, ranging from a complete plate lunch to à la carte service only. Somewhat over 54,000 of these public schools participate in the National School Lunch Program. This is a program, jointly administered by the U. S. Department of Agriculture and State educational agencies, which provides food assistance to schools operating a nonprofit food service for children. Schools participating in the program receive food assistance in the form of cash and commodity donations to help them serve well-balanced, low-cost noonday lunches. To be eligible to receive this assistance, schools must agree to operate the lunch on a nonprofit basis; serve meals that meet specified nutritional standards; and serve free or at a reduced price to children unable to pay.

Deliveries of all purchased and donated foods to a national probability sample of 500 public schools were recorded over a 12-month period at 2-month intervals,

* Agricultural Economist, Distribution Programs Research Section, Market Development Branch, Agricultural Marketing Service, U. S. Department of Agriculture.

beginning with July 1957 and ending with June 1958. The sample was divided into approximately 6 equal subgroups of schools, with invoices of deliveries taken in a rotating pattern to provide coverage in all months of the year so as to overcome seasonal factors. The value of deliveries was determined by using actual prices paid for food purchased by the sample schools and current market wholesale prices for donated foods. Information on the delivery invoices from the sample schools was tabulated for a 12-month period and projected to United States totals for deliveries and value on an annual basis. The Governments Division of the Bureau of the Census, under a cooperative arrangement with the Department of Agriculture, collected and tabulated the data reported herein.

TOTAL SCHOOL MARKET

The total value of foods, both purchased and donated, delivered to approximately 60,000 public elementary and secondary schools having a food service (either plate or à la carte) between July 1957 and June 1958 amounted to $597 million, or $28 per capita, based on average daily attendance figures of slightly over 21 million pupils. About $505 million, or 85 percent of the total value of food, was purchased

Fig. 2 – A fish-cookery demonstration by a U. S. Bureau of Commercial Fisheries home economist to school-lunch personnel, Charles Town, W. Va.

by the schools from local sources. The remaining portion, or approximately 15 percent of the total dollar value of commodities, comprised those donated directly by the Government from purchases made especially for school lunch or from stocks acquired under various price-stabilization programs.

Schools participating in the National School Lunch Program received 94 percent of the total value of foods delivered to public schools having a feeding service during the survey period. In the case of directly-donated foods, almost 98 percent of the total value of those items went to schools operating under the National School Lunch Program.

TOTAL AND PER CAPITA QUANTITIES OF FISH AND SHELLFISH

During the survey period, July 1957 through June 1958, almost 28 million pounds of fish and shellfish were purchased by public schools having a food service. Based on an average daily attendance figure of a little over 21 million pupils in this category of public schools, about 1.3 pounds of fish and shellfish per child were available for consumption.

Of the total quantity of fish purchased by this market outlet, almost 15 million pounds were in fresh or frozen form. From a volume standpoint, fish sticks were the most important item in the fresh and frozen category, accounting for almost 6 million pounds. Fish fillets accounted for slightly over 4 million pounds and fresh whole fish about 1.5 million pounds, with the balance made up of other fresh or frozen fish items. On a per capita basis, 0.7 pound of fresh and frozen fish and fish products combined were available for consumption in the schools serving food.

Slightly over 13 million pounds of canned fish moved into the school market between July 1957 and June 1958. Tuna was by far the most important canned fish item, accounting for almost 8 million pounds. It was followed by salmon, which represented slightly over 4 million pounds of the total for canned fish items. Bonito, sardines, and other canned fish items accounted for the balance of the volume of deliveries in this category.

Shellfish was a relatively minor volume item in the school lunch program. Somewhat less than 200,000 pounds of shellfish items were delivered to these schools during the survey period. This may be attributed in part to the relatively higher cost of many of the items making up the shellfish group.

TOTAL AND PER CAPITA VALUE OF FISH AND SHELLFISH

The wholesale value of all fish and shellfish purchased by public schools with food services during the survey period amounted to almost $13 million, or 60 cents per child, based on average daily attendance. From the standpoint of monetary value, canned fish items accounted for about $7 million, or 32 cents per child. The value of tuna fish deliveries came to almost $4 million, salmon to somewhat over $2 million, and the balance was for bonito, sardines, and other canned items.

In the fresh and frozen category, the wholesale value of all items amounted to $6 million, with fish sticks and fish fillets accounting for slightly over $4 million of the total. Fresh whole fish was relatively the least expensive item in this category. Results of the survey revealed that fish and fish products accounted for 2 cents out of each school food dollar.

PURCHASES AND VALUE OF FISH AND SHELLFISH BY TYPE OF LUNCH SERVICE

Information on purchases and value of fish as well as other foods was collected by two categories of schools--those public schools participating in the National School Lunch Program and for all other public schools providing food services but not participating in the Program. The per capita quantity of fish and shellfish delivered to public schools participating in the National School Lunch Program was 1.4 pounds, compared with 0.8 pound in all other schools having a food service. The per capita value of fish and shellfish available for consumption in participating schools was 62

cents, compared with 38 cents in schools not participating in the National School Lunch Program.

SOURCE OF SUPPLY AND BUYING PRACTICES

To evaluate a market outlet, information must be obtained on its usual sources of supply and on buying practices followed in filling needed food requirements. In the survey, school food buyers were asked where they bought their fish supply as well as other individual food items. Over 99 percent of the expenditures made for fish by school food buyers were made at the wholesale level. Another interesting point with regard to the source of supply was the substantial expenditure made for fish through orders given to route salesmen. Small schools, that is, those having an enrollment of less than 300 pupils, utilize very extensively the route salemen in placing their orders for fish and fish products. Approximately one-fifth of the expenditures for fish products were made through competitive bids by obtaining price quotations from two or more suppliers before placing orders.

PER CAPITA USE OF FISH IN RELATION TO SCHOOL AND COMMUNITY CHARACTERISTICS

The per capita use of fresh, frozen, and canned fish was greater in elementary than in secondary schools. In large schools, those having a pupil enrollment of 300 or more, the rate of use of fresh or frozen fish exceeded that found in smaller ones; however, the situation was reversed in the case of canned products. Per capita use of fresh or frozen fish in schools serving areas where average family income was under $4,000 was twice as large as that in schools serving areas where income was $4,000 or larger. In contrast, the per capita use of canned fish items, namely tuna and salmon which are relatively expensive fish products, was considerably less in schools serving low-income areas as compared with schools located in neighborhoods where family income was $4,000 or larger. A slightly higher per capita use of fish was found in schools located in communities of 2,500 people or less as compared with those located in more heavily populated areas.

THE INSTITUTIONAL MARKET

In 1957 Americans ate more than 80 million meals per day (at an annual cost of $17.5 billion) in mass-feeding establishments of one type or another. According to a recent report in a leading frozen food journal, one-fourth of the 1957 American food dollar went for meals eaten outside of the home.

About 73 percent of the meals served each day by institutions were handled by restaurants, cafeterias, lunch counters, refreshment stands, hotels, hospitals, and industrial cafeterias. The rest were served by schools, transportation systems, drug stores, penal institutions, etc.

It is expected that by 1975 the annual volume of the institutional food market will approximate $35 billion.

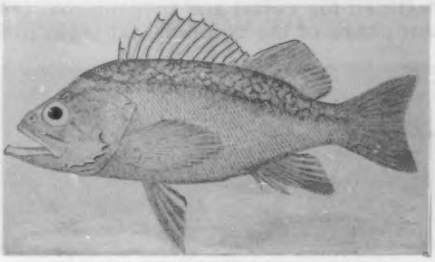
In 1957, the some 541,000 mass-feeding establishments in the United States spent about $7.5 billion for food purchases. Of this amount, 35 percent went for meats, 12.5 percent for fruits and vegetables, 9.5 percent for fish and shellfish, and 9 percent for poultry. It is anticipated that by 1975 institutions will be spending some $18 billion for food purchases.

RESEARCH IN SERVICE LABORATORIES

CHEMICAL COMPOSITION OF PACIFIC COAST FISH AND SHELLFISH

A two-year study of the proximate composition of halibut meat was completed earlier this year. Long-term studies on rockfish and sole are nearing completion. Composition studies of cod, salmon, and sheepshead are being continued; and composition studies on tuna are still under way.

A report on variations in the composition of halibut meat was presented at the annual meeting of the Institute of Food Technologists in Philadelphia May 20. The paper is scheduled for publication in the May 1960 issue of Food Research. Halibut meat is low in oil and sodium, and high in protein, thus providing an excellent food for a wide variety of regular and special diets.



Vermilion Rockfish (Sebastodes miniatus)

During the 3-month period covered by this report over 200 specimens have been collected for analysis. They include sheepshead, rockfish, sole, cod, silver salmon, and tuna. The analyses on rockfish should be completed this year, and those on sole early next year. The silver salmon represent the first series in a proposed study of that species, following the same general outline as was employed in the study of pink salmon.

Silver Salmon (Oncorhynchus kisutch)

One week in April was spent at Terminal Island, Calif., in the preparation of a second series of tuna samples for the tuna composition studies. Analyses have been completed on these samples, and tentative plans included the preparation of a third series in August, with the intent that a preliminary report on this first research phase can be available for presentation at the annual meeting of the Institute of Food Technologists in May 1960. The report on rockfish should also be ready for that meeting.

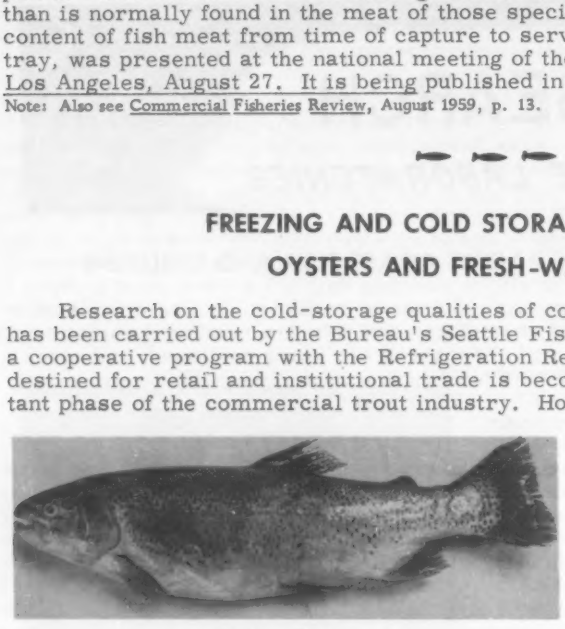
Analyses on two series of albacore have been completed. They represent frozen specimens from Japan, and iced specimens from Washington coastal waters. The fish are uniformly high in protein prior to precook averaging more than 25 percent. The Washington series had a much higher oil content than was found in the Japanese fish.

A preliminary study on the sodium content of raw commercially-frozen steaks and fillets from salmon, halibut, and rockfish has been completed. The results show that samples dipped in water before freezing have essentially the same sodium content as is found in the fish immediately after capture, but that samples dip-

ped in a salt solution before freezing have a sodium content several times higher than is normally found in the meat of those species. A paper describing the sodium content of fish meat from time of capture to serving on the table, or on a patient's tray, was presented at the national meeting of the American Dietetic Association in Los Angeles, August 27. It is being published in the journal of that association.
Note: Also see Commercial Fisheries Review, August 1959, p. 13.

FREEZING AND COLD STORAGE OF PACIFIC OYSTERS AND FRESH-WATER FISH

Research on the cold-storage qualities of commercially-reared rainbow trout has been carried out by the Bureau's Seattle Fishery Technological Laboratory in a cooperative program with the Refrigeration Research Foundation. Freezing trout destined for retail and institutional trade is becoming an increasingly more important phase of the commercial trout industry. However, very little has been published regarding the storage life to be expected from the product. In order to supply cold-storage data for trout, a test was initiated to determine the cold-storage life at various temperatures.



Rainbow Trout

Fresh rainbow trout purchased from a local trout farm were prepared in a manner being used by the industry to package frozen trout. The fish were frozen at -20° F., then ice-glazed, and packed in polyethylene bags. The bags of ice-glazed trout were packed in waxed fiber cartons which were overwrapped with waxed kraft paper. Samples were stored at -20° F., +10° F., and +20° F. Fish from each temperature were examined on a regular basis to determine the maximum storage life that could be expected from trout stored at that temperature.

The results of the tests showed that the trout stored at +20° F. were in acceptable condition up to 2.5 months of storage; those stored at +10° F. were acceptable up to 4.5 months; those stored at 0° F. or lower were acceptable at 16 months. Samples at 0° F. and -20° F. are being held for further examination. The limit of frozen storage is judged by the appearance and degree of rancidity of the sample.

NEW PRODUCTS FROM FISH OILS--MONOGLYCERIDES

Development of new products from fish oils is one of the objectives of fish-oil research of the Seattle Fishery Technological Laboratory. Fish oils are chemically unique as compared to animal and vegetable fats. They possess molecular characteristics such that application of certain chemical processes may be expected to result in the production of chemical derivatives not possible from these other fats.

Recent research has involved the synthesis of monoglycerides--used as emulsifiers and as intermediates in the production of certain detergents and plasticizers. The fish oils used were from sardine, herring, menhaden, pink salmon eggs, and tuna.

During the development stage of the synthesis of fish-oil monoglycerides, several problems were encountered during the analyses and the determinations of their states of purity. Attempts were made to determine the purity of the products by analytical fractional distillation, using a molecular-type still. It was readily learned that fish-oil monoglycerides did not lend themselves well to such a distillation method. More recently, work has indicated that distillation of a monoglyceride derivative (the acetylated product) could very satisfactorily be distilled at the desired conditions. It was shown that such a physical separation analysis compared quite favorably with results obtained from chemical tests.

In the beginning of this investigation, it was not definitely known whether or not the conversion of fish oils to monoglycerides proceeded in a random manner. That is to say, did the fatty acid portions of the oil react in a manner that could be described as following a statistical probability pattern? If this was not the case for our synthesis of monoglycerides, then chemical tests were unreliable. However, it was shown by good agreement with the distillation data, that the chemical tests were valid. The conclusion was, therefore, that fish oils with their inherent range of fatty-acid chain lengths do not react in any selective pattern, but do react randomly. This conclusion substantiated other reports of a similar process involving vegetable oils.

Note: Also see Commercial Fisheries Review, August 1959, p. 15.

STUDY OF CHEMICAL COMPOUNDS FORMED DURING SPOILAGE OF FISH

A number of the classes of chemical compounds that could be present in spoiling fish have received little research attention. Some of these are neutral carbonyls, acidic carbonyls (keto acids), and esters.

Recently, the content of neutral carbonyls, keto acids, and volatile esters was determined in samples of cod meat of different degrees of spoilage. Volatile esters were not found in fresh or spoiled cod, whereas neutral carbonyls and keto acids were present in both the fresh and spoiled samples. Paper chromatographic analysis of the keto acids indicated that pyruvic and alpha-ketogluteric acids were present in approximately equal concentrations in the fresh and spoiled samples. Quantitative colorimetric tests have shown that benzene-soluble carbonyls (mainly neutral carbonyls) increase in cod during spoilage. Preliminary results indicate that a sharp increase in carbonyl content occurs in cod at about the time that the fish would be judged organoleptically unacceptable. Additional work on the neutral carbonyls is being planned for the future. Consideration will be given to the carbonyl content of spoiling fish as it affects mechanism of spoilage and its potential usefulness as a condemnation test.

Note: Also see Commercial Fisheries Review, August 1959, p. 17.

THREAD HERRING MEAL NUTRITIONAL STUDIES

Studies on the nutrional value of the Gulf of Mexico thread herring meal have been started by the U. S. Bureau of Commercial Fisheries technological laboratory at College Park, Md.

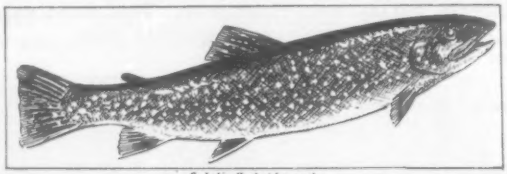
The studies involve (1) nutritional tests with rats within the laboratory, (2) metabolizable energy, and (3) digestibility of the meals. Metabolizable energy and digestibility studies are to be carried out under contract by Lime Crest Laboratory in New Jersey.

The Gulf thread herring, since it is available in large schools and possesses a high fat content during the winter, promises to develop into a winter industry to supplement the summer menhaden industry in the Gulf. A total of 55 vessels are reported agreed to fish for thread herring. There are two species available; one with a fat content of 21 percent is suitable and the other, with a fat content of 3 percent, has no practical use now.

SPLAKE--HYBRID PRODUCED BY CROSSING LAKE TROUT AND BROOK TROUT

New or exotic fish species have a certain appeal. One of these is the splake, a hybrid, which is produced by crossing a lake trout with a brook trout.

Although sometimes reported as a new species, the splake was described at a meeting of the American Fish Cultural Association in 1880. The report at this meeting stated that an R. B. Roosevelt gave a paper on hybrids in which he described the cross of lake trout female by brook trout male and indicated that hybrids of this type were being held in a hatching house in New York State. Wisconsin also crossed female lake trout and male brook trout in 1884.



Splake (hybrid trout)

Records are incomplete, but apparently little was done with this species for a number of years. Interest in the splake was revived in the last decade.

In 1957 Wisconsin obtained some splake fingerlings from Marquette, Mich., through the courtesy of the Michigan Conservation Department. During 1958, 4,000 of these splake were stocked in Little Bass Lake, Oneida County. A 17-inch size limit was imposed on this species and it will take several years for them to reach legal size.

The Crystal Springs trout hatchery recently completed stocking 1,000 6-inch splake from the same source in Crystal Lake, Vilas County. These hybrids were produced by fertilizing lake trout eggs with brook trout sperm. This hatchery also has on hand 3,800 lake trout female-brook trout male hybrid fingerlings and 7,300 fingerling hybrids obtained by crossing brook trout female-lake trout males.

The lake trout eggs fertilized by brook trout sperm apparently produce the hardiest splake. Progeny resulting from a reversed cross are frequently weak and crippled, since the brook trout egg is too small for a lake trout embryo. A great percentage of the weaknesses are evidenced in the form of deformed tails.

In appearance the splake resembles both parents. It retains the square tail of the brook trout, but the red speckles are not as prominent. Its body shape is slimmer than that of the brook trout. This is especially true of young splake.

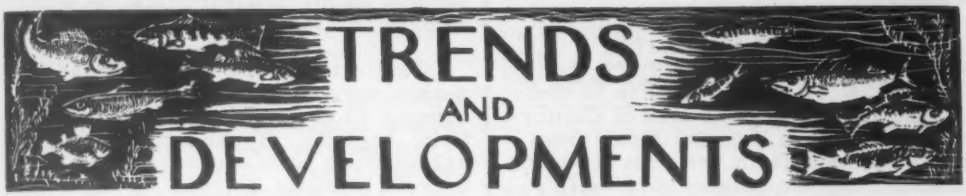
The introduction of splake in Little Bass Lake has been too recent to determine its success. However, the State of New York has been managing several lakes for this species since 1954. Fingerlings from 3.5 to 5 inches were stocked in the fall. In one year, they had increased in length by $2\frac{1}{4}$ to 8 inches.

In the upper peninsula of Michigan splake were introduced in one lake three years ago which are now 17 inches in length.

The splake is an avid feeder and therefore makes rapid growth gains. Canada reports excellent growth of fingerling splake stocked in Agnes Lake in 1951. By 1953 some of the fish weighed almost 2 pounds.

Canadian fish culturists report that these hybrids are fertile and have successfully spawned in lakes in which they have been introduced. The Michigan Department of Conservation has successfully fertilized splake eggs with sperm from splake males.

This fish has the reputation of being a good fighter and a tasty fish as well. Habitat requirements of this hybrid are intermediate between the lake trout and the brook trout. Reports indicate that this fish utilizes the upper regions of a lake more frequently than does the lake trout. These attributes make him very popular with anglers. If the splake introduction in Wisconsin lakes is successful, some excellent fishing is in store for our fishermen.



American Samoa

TUNA LANDINGS BY JAPANESE VESSELS, 1957-58:

In 1957 a total of 56 Japanese vessels landed 255 trips in American Samoa with 8,667 metric tons of tuna, of which 5,535 tons was albacore, 1,523 tons was yellowfin, and 500 tons was big-eyed tuna, according to the "Annual Report of Catch Statistics for 1957," published by the Japanese Ministry of Agriculture and Forestry.

According to a report, "The Present Condition of the Japanese Fishing Industry," published in July 1958 by the Japanese Fisheries Agency, the number of Japanese tuna vessels operating out of American Samoa in 1958 was 42, and the deliveries were being held within the range of approximately 10,000 metric tons a year.

According to preliminary figures supplied by the Japanese Fisheries Agency, landings by Japanese vessels at Samoa in 1958 totaled 10,567 metric tons made up of 8,169 tons of albacore, 1,963 tons of yellowfin, and 432 tons of big-eyed tuna.

The 1959 edition of "Present Conditions and Prospects in the Export of Agriculture, Forestry, and Fishery Products," published by the Japan Export Trade Promotion Agency (JETRO), reports sales in 1958 to the cannery in Samoa of 12,688 short tons of fish, including 8,964 tons of albacore, 2,150 tons of yellowfin, and 476 tons of big-eyed tuna. The report states that these figures represent landings from 268 trips, and it further states that hitherto the quota for deliveries to Samoa had been 10,000 tons annually but that this had been increased in 1958 to 12,000 tons. According to this report, the long-liners based at Samoa are of 50 to 150 tons gross.

Figures informally supplied by the Ministry of International Trade and Industry show that from October 1957 to June 1959 landings at Samoa totaled 15,859 short tons, valued at US$2,756,614, for a monthly average of 752 short tons.

As for how the limitation of 12,000 tons of tuna to American Samoa and other similar tuna export limitations are imposed and enforced, the situation seems to be as follows: The Ministry of International Trade and Industry has legal authority under the Foreign Exchange and Foreign Trade Control Act of December 1949 to regulate the export of certain commodities by the issuance of export licenses. In the case of tuna, which is one of the commodities covered, the Ministry must consult with the Ministry of Agriculture and Forestry concerning the regulation of exports. The Ministry of Agriculture and Forestry consults with the producers' organization, the Export Frozen Tuna Producers Association, and the exporters' organization (the Japan Frozen Foods Export Association), which exist under the authority of the Fishery Exports Promotion Act of 1954, as revised in 1957, and which are placed by that law under the supervision of the Ministry of Agriculture and Forestry. In the case of an export arrangement which involves the basing of tuna fishing boats in a foreign country, as in Samoa, the Ministry of Agriculture also consults with the Japan Federation of Tuna Fishery Associations.

TUNA LANDINGS, JANUARY-AUGUST 1959:

American Samoa Tuna Landings, January-August 1959

Species	1959			Jan.-Aug.	
	June	July	August	1959	1958
	(1,000 Lbs.)				
Albacore	1,533	2,208	1,921	13,207	13,734
Yellowfin	459	388	206	3,108	3,872
Big-eyed	119	68	12	681	845
Skipjack	-	-	4	4	-
Total	2,111	2,664	2,143	17,000	18,451

Note: Most of these tuna were landed by Japanese vessels; a small amount by South Korean vessels.

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California

ALBACORE TUNA MIGRATION OFF PACIFIC COAST STUDIED:

M/V "N. B. Scofield Cruise 59-S-4-Albacore: The offshore area of California and northern Baja California from approximately 265 miles west of Point Montara (San Francisco) to 530 miles west of Todos Santos Island (Ensenada, Baja California) was surveyed by the California Department of Fish and Game research vessel N. B. Scofield from June 1-25, 1959. This cruise was made in cooperation with that scheduled for the M/V Hugh M. Smith by the Hawaii Biological Laboratory, U. S. Fish and Wildlife Service, to explore this offshore area prior to the commercial albacore season in an attempt to determine the occurrence and migration route of albacore schools approaching the Pacific Coast; to tag and release albacore; and to gather biological and oceanographic data that might be related to the occurrence of albacore.

Approximately 1,600 nautical miles of the 2,000-mile survey track were scouted during daylight hours, by using surface trolling gear.

The first albacore schools of the 1959 season were located June 5 in an area between 90 and 120 miles W. by N. of Point Arguello. By the end of the survey, 312 albacore were caught in an area lying between latitudes 32° 20' N. to 37° 30' N. and longitudes 121° 22' W. to 128° 23' W.

Best fishing, as evidenced by an average catch of $3\frac{1}{2}$ to $5\frac{1}{2}$ fish per trolling hour, was found from latitude 33° to 34° N., between longitude 124° and 125° W. Ninety-eight percent of the albacore caught ranged from 11 to 14 pounds. The remaining two percent was evenly divided between the nine and 20-pound groups. Food organisms recovered from stomachs of untagged fish and from regurgitated matter consisted primarily of Pacific sauries, squid, larval northern anchovies, Pacific jack mackerel, pelagic barnacles, and euphasiids.

Gill net (consisting of 10 shackles $4\frac{1}{2}$ to $7\frac{1}{2}$ inch mesh) was set 390 miles W. by N. of Point Arguello. The gear fished

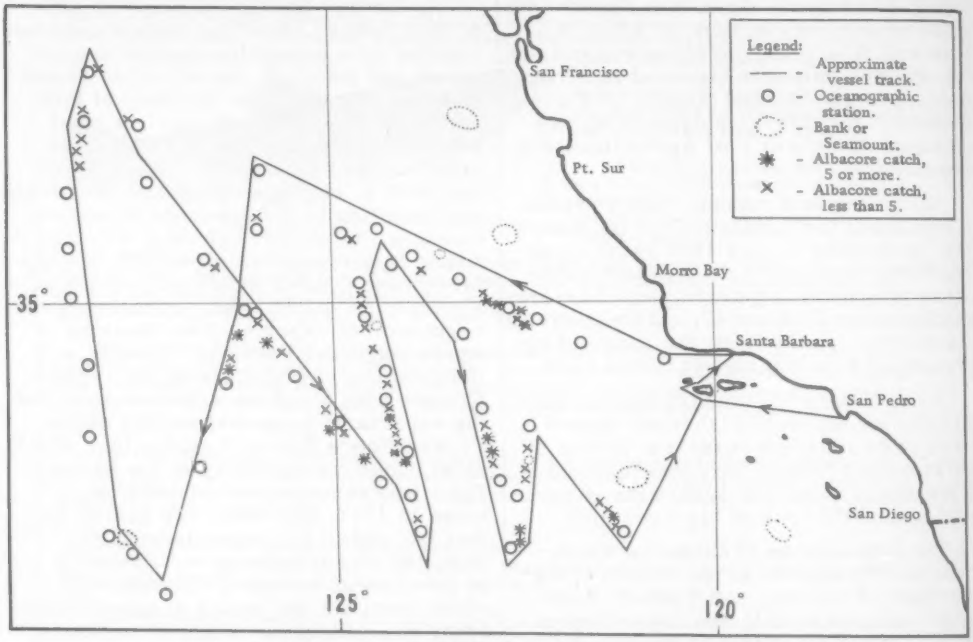

Fig. 1 - M/V N. B. Scofield Cruise 59-S-4-Albacore (June 1-25, 1959).

overnight and no catch resulted. Other sets were omitted because of weather conditions.

Albacore were tagged to determine movements and growth rates, and to compare recovery rates of "spaghetti" tags with those of more rapidly applied dart tags. The number of albacore tagged at any given location varied from 1 to 22.

Dart and "spaghetti" tags were used alternately. Trouble with breakage of the dart heads interrupted the sequence occasionally and only 95 fish with dart tags compared to 110 with "spaghetti" tags were released.

Sea surface temperatures ranged from a low of 12.2° C. (54° F.) near Point Conception and the northern Channel Islands to a high of 17.8° C. (64° F.) in the extreme southwesterly area of the survey. All albacore were caught in water ranging from 14.8° C. (58.6° F.) to 16.3° C. (61.3° F.)

Bathythermograph casts were made 2 to 3 times each day at distances apart averaging 45 miles (range: 20 miles to 90 miles).

Surface water samples for inorganic phosphate analysis and salinity determination were collected at each bathythermograph station. Surface water samples for Carbon 14 analysis were collected and field processed at 16 stations.

A 20-minute surface plankton tow with a one-meter net was made at five evening stations.

One night light station was occupied while drifting with the gill net. An estimated 10 to 30 Pacific sauries were the only organisms noted under the 1,500-watt light. Weather and sea conditions made it necessary for the vessel to maintain headway at night rather than drift which is essential for operating night light stations successfully.

Daytime observations were interesting because of the lack of marine life in areas where albacore were caught. The largest concentration of birds consisting of gulls, terns, storm petrels, and shearwaters was noted in areas of cold dirty water within 30 miles of Point Conception.

Note: Also see Commercial Fisheries Review, Sept. 1959 p. 21.

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PELAGIC FISH POPULATION SURVEY OFF COAST OF SOUTHERN CALIFORNIA CONTINUED:

Airplane Spotting Flight 59-13-Pelagic Fish: The inshore area from the Mexican border to Pigeon Point was surveyed from the air (June 29, July 1-2, 1959), by the California Department of Fish and Game Cessna 170 (1359D) to determine the distribution and abundance of pelagic fish schools.

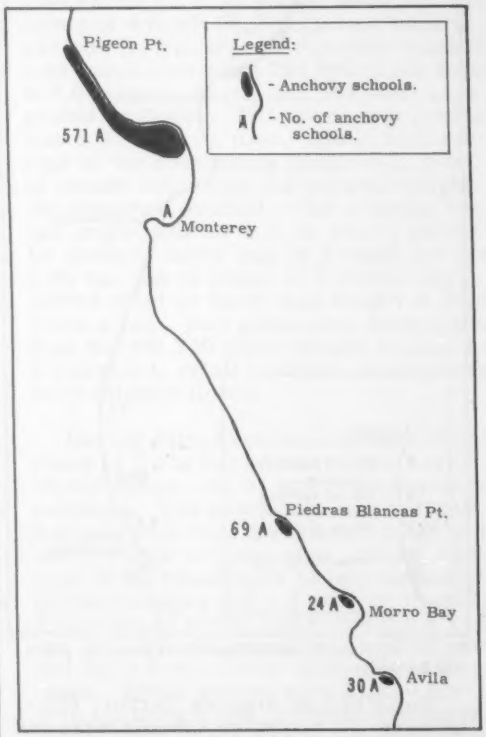

Fig. 1 - Airplane Spotting Flight 59-13 (June 29, July 1 and 2, 1959).

Possibly as a result of storm conditions during the week preceding the survey, very few fish schools were seen between Los Angeles Harbor and the Mexican border. Although weather conditions

were perfect and the water clear, only 9 anchovy schools and 1 of white sea bass were seen: 6 of the anchovy schools were close to shore near Scripps pier at La Jolla, 2 just off the mouth of the Tijuana River, and 1 three miles off San Onofre. A large white sea bass school was seen three miles off the town of Carlsbad.

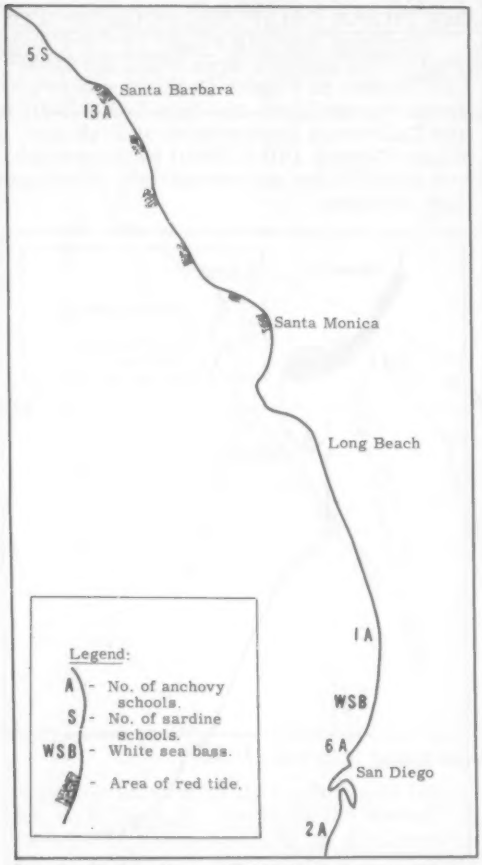

Fig. 2 - Airplane Spotting Flight 59-13 (June 29, July 1 and 2, 1959).

North of Los Angeles Harbor, 707 anchovy and 5 sardine schools were tallied. The majority of the anchovy schools (571) were observed at the north end of Monterey Bay in a gradually diminishing band reaching to Ano Nuevo Point. These schools varied widely in size but were visible as dark, tight balls when in deep water and loose stringy concentrations when close to shore. It was not possible to scout the southern two-thirds of Monterey Bay because of a thick, low, cloud cover. The five sardine schools were seen east of Point Conception 2 to 3 miles off El Capitan. The remainder of the anchovies were found in four small groups in the following locations: outside the kelp between Santa Barbara and Montecito (13 schools); San Luis Obispo Bay (30 schools); north end of Estero Bay (24 schools); and San Simeon Bay (69 schools).

Water conditions south of Point Vicente and north of Santa Barbara were good with clear clean water. From Point Vicente to Santa Barbara the inshore water was very dirty and heavy dinoflagellate blooms occurred between Ballona Creek and Santa Monica east of Malibu pier, at the northeast end of Zuma Beach, between Port Hueneme and Ventura, near Ricon Point and between Summerland and Santa Barbara.

Many concentrations of jellyfish (probably Vellela) were seen in Monterey Bay. They showed up as greenish-white streaks when viewed from 1,500 feet but took on a lavender cast when observed from a low level.

Note: Also see Commercial Fisheries Review, September 1959 p. 22.

Canned Fish

CONSUMER PURCHASES, OCTOBER 1958-MARCH 1959:

Approximately 108.8 cases of canned tuna were purchased per 1,000 families in the United States during October 1958-March 1959. Imported tuna represented about six percent of those purchases. By types of pack, purchases of domestic chunk tuna at 67 cases far exceeded purchases of solid-pack at 23.2 cases and grated at 12.5 cases per 1,000 households.

Total purchases of both domestic pack and imported canned tuna were highest in those families whose head of the household had a college education. However, families whose head had only high school training purchased more solid pack and grated tuna.

Families with teenagers purchased more solid-pack tuna and more grated tuna than those households with no children or with children of younger age groups. Those families with children aged 6-12 bought more chunk-style and the imported product than did families in the other categories.

Families in which the wives were not employed purchased about 11 percent more canned tuna than those in which the wives were working. Those households with nonworking wives bought 21 percent more chunk-style, 27 percent more imported, and about the same amount of grated tuna as the households in which the wives were employed.

During October 1958-March 1959, 33.5 cases of canned salmon were purchased per 1,000 families in the United States. Pink salmon made up about 53 percent of those purchases, while red salmon purchases amounted to 21 percent of the total.

Total purchases of canned salmon were highest in those families in which the head of the household had only a grade school education. However, families with a college-educated person as head of the household bought more chinook, red, and medium red salmon than did families whose heads had grade school and high school education only.

Purchases of red salmon by families without children were larger than those purchases by households with children. However, families with children of preschool age led other groups in purchases of chum salmon. Households with teenagers bought about 111 percent more pink salmon than families without children, and 14 percent more than those with children 6-12 years old.

Households in which the housewife was not employed purchased 34.8 cases of salmon which was about 16 percent greater than the purchases made by those families in which the housewife was employed.

A recent publication of the U. S. Bureau of Commercial Fisheries contains information on consumer purchases of canned fish by family characteristics for six months beginning with October 1958. The data (provided by the Market Research Corporation of America under a contract financed by the Bureau) represents estimates of national purchases by household consumers only. The report summarizes the data on purchases of canned tuna, canned salmon, and canned sardines. The purpose of this report is to provide additional information concerning buying practices of households as related to regions, city-size locations and other socio-economic factors.

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CONSUMER PURCHASES, JULY 1959:

Canned tuna purchases by household consumers in July 1959 were 998,000 cases of which 64,000 cases were imported. By type of pack, domestic-packed tuna purchases were 217,000 cases solid, 616,000 cases chunk, and 101,000 cases grated or flakes. The average purchase was 1.9 cans at a time. About 32.0 percent of the households bought all types of canned tuna; only 2.2 percent bought the imported product. The average retail price paid for a 7-oz. can of domestic solid or fancy was 34.9 cents and for a 6½-oz. can of chunk 27.6 cents. Imported solid or fancy was bought at 28.6 cents a can. July purchases were higher than the 964,000 cases bought in June by 3.5 percent; retail prices in most cases were slightly lower.

During July, household consumer purchase of California sardines were 36,000 cases; and 31,000 cases imported sardines. The average purchases was 1.5 cans at a time for California sardines and 1.9 cans for imported. Only 1.7 percent of the households bought canned California sardines and 1.8 percent imported. The average retail price paid for a 1-lb. can of California sardines was 23.9 cents, and for a 4-oz. can of imported 26.6 cents. Retail prices were higher for both California and imported canned sardines. July purchases of California sardines were lower than the 41,000 cases bought in June by 12.2 percent.

Canned salmon purchases in July 1959 were 216,000 standard cases, of which 112,000 cases were pinks and 53,000 cases

reds. The average purchase was 1.2 cans at a time. About 14.8 percent of the households bought all types of canned salmon; 7.3 percent bought pinks. The average retail price paid for a 1-lb. can of pink was 57.2 cents and for red 88.0 cents. July purchases were down about 4.0 percent from the 225,000 cases bought in June.

Canned Foods

OUT-OF-STOCK CONDITION COSTLY TO STORES:

A typical supermarket loses about $3,000 a year in canned food sales when out of stock. This was the conclusion in reporting the highlights of the Out-of-Stock Study to the trade press in an August 21 release by the National Canners Association public relations counsel. The study was based on findings of a 12-week period (June through August 1957) in 12 supermarkets in the Philadelphia-New Jersey area.

The report makes the following summary of findings with reference to fishery products:

The most serious out-of-stock conditions were found in the canned fish and canned meat and poultry groups. On the average more than 5 percent or 5 of the 98 items in these groups were out-of-stock each day in each supermarket.

For canned foods as a whole, Friday was the day of the week with the lowest percentage (2.4 percent) of items out-of-stock, followed by Thursday with 3.0 percent. Monday, Tuesday, Wednesday, and Saturday all showed an average of 3.3 percent out-of-stock. (Information Letter, August 29, 1959, National Canners' Association).

Cans--Shipments for Fishery Products, January-July 1959

Total shipments of metal cans for fishery products during January-July 1959 amounted to 66,657 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 62,978 tons in the same period a year ago. Canning of fishery products in July this year included tuna, Maine sardines, salmon, shrimp, and squid. Shipments of metal cans were up by 19.4 percent from June to July this year, but lower by 8.5 percent for this year as compared with July a year ago.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.

Central Pacific Fisheries Investigations[1/]

SKIPJACK TUNA BEHAVIOR STUDIED IN VICINITY OF HAWAIIAN ISLANDS:

M/V "Charles H. Gilbert" Cruise 45: The chief objective of the 60-day cruise around the main Hawaiian Islands and French Frigate Shoal by the U. S. Bureau of Commercial Fisheries Research vessel Charles H. Gilbert was to study the behavior of tuna, with the long-term goal of using the knowledge obtained to aid the Hawaiian commercial tuna fishermen. About all of the July-August 1959 research was devoted to skipjack or aku. The reactions of skipjack were noted when various kinds of bait were used, when baits were "pepped up" with enhancers such as glittering tinsel and water sprays, when the amount of bait was varied, and when colored dyes and various sounds were introduced into the water. Although the results of these experiments will only be known in detail after weeks of analysis, it is hoped that we will ultimately discover what it is that makes a good bait, and also how this bait should be used. The cruise was completed on September 3, 1959.

1/ These investigations prior to the August 1959 Commercial Fisheries Review were listed under Pacific Oceanic Fisheries Investigations.

A new blister-type underwater observation chamber on the vessel was used. From this vantage point 7 feet beneath the surface, observers watched tuna activity during fishing. They recorded fish behavior on movie film and personal impressions on voice records. The blister was an outstanding success, for not only was it free from annoying bubbles, which limited the use of previous chambers, but its spaciousness enabled biologists to observe tuna behavior for several hours in reasonable comfort.

The new blister is superior to underwater television as a device for studying tuna behavior. Although the television camera occasionally "saw" farther through the water than the human eye or a movie camera, its adjustment and operation were too delicate for the rugged conditions normally prevailing during tuna fishing.

Because certain experiments could not be conducted on the high seas, 73 skipjack were placed in the vessel's livewells, and 37 of these were later transferred to a salt-water swimming pool at the Bureau's Kewalo laboratory. Because skipjack tuna are very excitable tranquilizing drugs were used experimentally to quiet the fish. The drugs also helped to quiet some specimens of the more docile little tuna (kawakawa), in the pond when the skipjack were introduced.

A seal and turtle census was conducted at French Frigate Shoal which is about 500 miles northwest of Honolulu.

* * * * *

NEW LIVE-BAIT RESOURCES FOR HAWAIIAN SKIPJACK TUNA FLEET STUDIED

One of the factors limiting the total landings of skipjack in Hawaii is the availability of live bait. Nehu, a local species of anchovy, is the principal bait and is frequently in short supply. Also, nehu are difficult to keep alive in the bait wells, thus further limiting the available supply and limiting the distance and time of operation of the sampans.

The Honolulu Biological laboratory of the U. S. Bureau of Commercial Fisheries is presently engaged in studies directed towards both supplementing the live-bait supply available to the Hawaiian skipjack fleet and developing a more hardy bait. Three species are presently under investigation, tilapia (Tilapia mossambica), Marquesan sardine (Harengula vittata), and threadfin shad (Dorosoma petenensis).

The tilapia studies are approaching completion. The results of these studies indicate that these fish can be economically reared in ponds; that they may be readily acclimatized from fresh to sea water; that early spawning may be induced, thus making adequate supplies of the bait available to the fisherman at the onset of the skipjack season; that they are a hardy fish and can be carried in the bait wells for several days or weeks through oceanic areas with changes of temperature of at least 10° F., and that, when properly used, they are a good bait for large skipjack. The results of these tilapia investigations were one factor in the State Legislature appropriating $130,000 for the construction and $50,000 for maintenance of a tilapia rearing facility by the State Department of Fish and Game.

During a survey of the fishery potentials of the waters of French Oceania, the Marquesan sardine was used exclusively as bait during live-bait fishing for skipjack and yellowfin. Because of its proven qualities, a program of introduction of this fish into Hawaiian waters was started in 1956. All introductions were made in waters near the Island of Oahu. By 1959, as indicated by recoveries made by commercial fishermen during baiting operations, these fish had moved to waters near at least seven of the eight major islands. For use by the fishermen, jars with formalin and labels have been left at strategic points on the Islands.

A particularly interesting collection was made in Kaneohe Bay in early August. One of the sardines in this collection was the largest (about 6 inches) seen by the biologists--larger than any reported from the waters of either French

Oceania or Hawaii. In addition, further evidence of successful spawning was given by the presence of $2\frac{1}{2}$-inch sardines in this collection.

During 1959, a small shipment of threadfin shad was introduced into reservoirs. This potential live bait, native to Tennessee and now well established in the lower Colorado River watershed, spawns in fresh water but is readily acclimatized to sea water.

On August 27, 1959, a shipment of approximately 3,500 threadfin shad was received in Honolulu. These fish were collected in southern California and transported to Hawaii. Shipped in sea water, the fish were acclimatized to pure fresh water upon arrival and then planted in various reservoirs on the Islands of Oahu, Kauai, and Maui and in tanks at the laboratory. The latter fish are to be used as a stockpile in case of failure of some of the other plants. Although apparently not as hardy as either the tilapia or Marquesan sardines, only a few shad were lost during transport and handling of the August shipment.

Although nehu will undoubtedly be the primary live bait used by the Hawaiian skipjack fleet for some time to come, it is anticipated that one or more of these new potential baits will be used to supplement the inadequate supply of nehu--particularly during those periods when "season" fish are available to the fleet and, either because of exploitation or lack of availability due to natural causes, the nehu are in short supply.

Clams

SOFT-SHELL CLAMS FOUND IN MARYLAND CHESAPEAKE BAY WATERS:

There is a large crop of soft-shell clams in Anne Arundel and Queen Anne's County Chesapeake Bay waters, according to a shellfish biologist at the Maryland Chesapeake Biological Laboratory. Most of the quarter-million bushels of clams were found along the inshore, sandy edges of once-productive oyster bars, where oysters no longer are able to survive in commercial quantities.

The first phase of the biologist's findings was followed with a precedent-breaking step by the Maryland Tidewater Fisheries Commission, which maintains tight control over the State's oyster bars. The charted bars in the past have always been off-limits for any other use, regardless of whether or not oysters were present. The Commission broke the precedent after the fact-finding survey and opened parts of the grounds to fishing. The Commission received considerable encouragement for its action from the clam fishermen who themselves are largely former oystermen.

The biologist began the survey two years ago at the request of Anne Arundel watermen, hoping to work in the inshore side of the Three Sisters oyster bar. Using a mechanical clam digger, he quantitatively checked a 350-acre area and found a crop of 252 bushels to the acre. "Incidentally, we didn't see a single live oyster there," the biologist declared. Many years ago, the bar was one of the Chesapeake's best sources of oysters. In 1958, 300 more acres were surveyed on Three Sisters, plus 235 acres off Kent Island on Broad Creek Bar's inner edge.

Meanwhile, at the request of Somerset County watermen, Tangier and Pocomoke Sound bottoms were checked and plenty of clam shells were found, but no clam population worth harvesting. The hurricanes in 1954 and 1955 may have stirred up the bottom too much and killed off most of them.

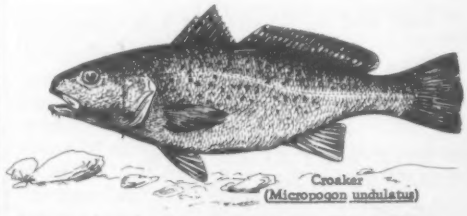
It was while checking the clam population in the Sounds that the biologist reported enormous concentrations of buried oyster shells in the area. The Tidewater Fisheries Commission Chairman later announced an ambitious program aimed at rehabilitating the oyster industry by using these and other oyster-shell deposits.

In June of this year the Chesapeake Biological Laboratory sent two biologists to the Three Sisters area again. They checked 225 more acres to discover a population of 295 bushels to the acre.

Croakers

BIOLOGIST REPORTS ON DISAPPEARANCE OF YOUNG IN CHESAPEAKE BAY:

The disappearance of young croakers in the Chesapeake Bay was discussed by a biologist of the Virginia Fisheries Laboratory, Gloucester Point, Va., at the annual meeting of the American Fisheries



Croaker (Micropogon undulatus)

Society held at Clearwater, Fla., September 17-18. The study of the movement of young croakers within the Bay was begun by the Laboratory in 1950. In recent years the Virginia biologists have continued tracing the movements of these young fish and report that heavy kills occurred during the winter of 1957 and 1958 probably due to protracted cold weather.

Great numbers of young croakers appeared in the Bay and its rivers during the fall of 1957, which portended excellent fishing two years later. However, the situation changed during the winter months. "Although there were considerable numbers of young croakers present during the fall of 1957, they disappeared in mid-winter. Their disappearance coincided with a period when water temperatures were extremely low for a long period of time. Probably the extreme low temperatures destroyed the young croakers," the biologist stated.

Although croakers of large size have been caught this past summer and large numbers were caught in the commercial traps on Virginia's eastern shore during September, the chances of catching croakers of any size in 1960 will be extremely poor. "Not until there has been a successful development of young croakers through the winter will the depleted stocks be replenished," the biologist declared.

According to scientists croakers spawn in the fall and throughout early winter. The eggs hatch out in ocean waters just beyond the mouth of the Chesapeake Bay and the young migrate into the Bay and up the rivers. There they remain throughout the remainder of the winter, spring, and summer, and return to the ocean in the fall when they are about a year old. Adults migrate into the Bay in spring and return to the ocean in the fall.

Cooperative surveys from the research vessel Pathfinder with scientists from the Chesapeake Biological Laboratory of Maryland have indicated that the scarcity of young croakers occurred not only in Virginia but also in Maryland during the winter and spring of 1958. The absence of year-old croakers in pound nets in the fall of 1958 also confirmed that the spawning for the previous fall and winter was extremely poor.

A similar kill occurred during the winter of 1958 and 1959 and experience indicates that no recovery of the croaker fishery can be anticipated for at least two years.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-AUGUST 1959:

Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 2.1 million pounds (value $859,000) of fresh and frozen fishery products were purchased in August 1959 by the Military Subsistence Agency field headquarters. The quantity purchased in August was down 7.0 percent from the preceding month, but was 30.6 percent above the amount purchased in August 1958. The value of the purchases in August 1959 was lower by 28.6 percent as compared with July and down 7.1 percent from August 1958.

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, August 1959 with Comparisons

QUANTITY				VALUE			
August		Jan.-Aug.		August		Jan.-Aug.	
1959	1958	1959	1958	1959	1958	1959	1958
(1,000 Lbs.)				($1,000)			
2,112	1,617	15,730	16,196	859	925	8,049	9,334

For the first eight months of 1959 purchases totaled 15.7 million pounds, valued at $8.0 million--a decrease of 2.9 percent in quantity and 13.8 percent in value as compared with the same period of 1958.

Prices paid for fresh and frozen fishery products by the Department of Defense in August 1959 averaged 40.7 cents a pound, 12.2 cents less than the 52.9 cents paid in July and 16.5 cents less than the 57.2 cents paid during August 1958. This indicates that prices were lower and lower-priced products were purchased this August.

Canned Fishery Products: Sardines and tuna were the principal canned fishery products purchased for the use of the Armed Forces during August 1959. During January-August 1959 purchases of

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, August 1959 with Comparisons

Product	QUANTITY				VALUE			
	August		Jan.-Aug.		August		Jan.-Aug.	
	1959	1958	1959	1958	1959	1958	1959	1958
	(1,000 Lbs.)				($1,000)			
Tuna	150	908	2,132	3,470	59	1/	997	1/
Salmon	2	1	15	1,401	2	1/	11	1/
Sardines	194	41	970	93	27	1/	143	1/

1/ Unavailable.

the three principal canned fishery products were lower by 37.2 percent from the purchases made in January-August 1958. Purchases of canned tuna were down by 38.6 percent and about 99.0 percent for salmon, but canned sardine purchases increased almost 10 times over the purchases during the first eight months of 1958.

Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher because it is not possible to obtain local purchases.

Fish Ladders

EFFECTIVENESS OF DIFFERENT TYPES OF SALMON FISHWAYS STUDIED:

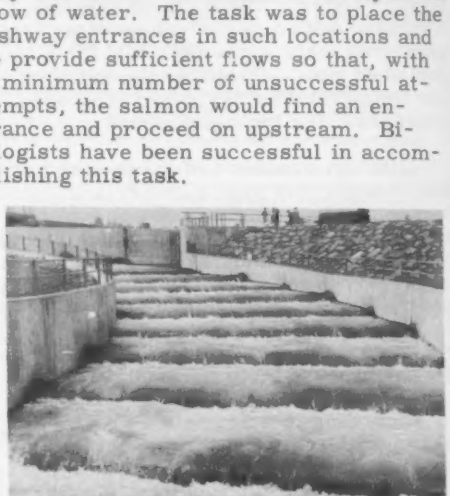
Recent studies were conducted on the passage of blueback or sockeye salmon at the U. S. Bureau of Commercial Fisheries experimental research facility at Bonneville Dam. During the course of these studies 26 fish were individually timed in each of two types of endless fishways. The fishways were of the conventional ladder type, one fishway having 8-foot pools with 1-foot rise between pools; the other had 16-foot pools with 1-foot rise between pools. The mean time required for blueback salmon to ascend 104 pools of the 1-on-8 fishway was 2 hours and 57 minutes; for the 1-on-16 fishway 2 hours and 21 minutes. Tests were conducted previously on passage time for chinook salmon.

Results to date indicate the much cheaper to construct 1-on-8 fishway is about as effective as the 1-on-16 fishway for passing salmon over dams.

* * * * *

BUREAU OF COMMERCIAL FISHERIES ACTIVITIES REVIEWED:

Research and management biologists of the U. S. Bureau of Commercial Fisheries and the States of Washington, Oregon, and Idaho, have done a great deal toward devising and testing methods for passing fish over dams. The scientists have found that the problem of getting adult salmon over dams can be met in a number of ways. Salmon migrating upstream are attracted to those areas from which water is flowing. For example, at Bonneville Dam there are ten draft tubes from each of which some 12,500 second feet of water is issuing. In addition, there is a spillway with 16 normally-functioning gates each 50 feet wide and, of course, there are the fishway entrances with their relatively small flow of water. The task was to place the fishway entrances in such locations and to provide sufficient flows so that, with a minimum number of unsuccessful attempts, the salmon would find an entrance and proceed on upstream. Biologists have been successful in accomplishing this task.



Fish ladder at Bonneville Dam, Columbia River.

There are, of course, other means of providing upstream fish passage at dams, such as fish locks, trams, or by trapping and hauling. Whenever possible, biologists prefer to have the fish ascend a fish ladder. However, in the case of some high dams, the only practical procedure is to trap and haul the fish over in tank trucks.

Many improvements have been made in fish ladder design, and experiments are being conducted at the research facility at Bonneville to determine the optimum pool length and width which will pass salmon most effectively. Recently it has been found that both the length and width of the steps in fish ladders may be reduced. This will result in a substantial saving of money in the design of future fishways.

The problem of providing safe passage over dams for young salmon en

route to sea is much more difficult. However, various schemes have been worked out and are being tested at the present time. In particular, fingerling "skimmer" facilities and a fingerling "ski jump" have been installed above Pelton Dam on the Deschutes River in Oregon. These methods are passing young fish and experiments are under way to measure their effectiveness. Another new approach is being investigated by scientists at the Bureau's Seattle laboratory. This entails guiding fingerlings into traps or bypasses by an array of energized electrodes placed in the forebay of dams. Guiding fish by electricity is being evaluated at Lake Tapps, Wash.

Great Lakes Fisheries

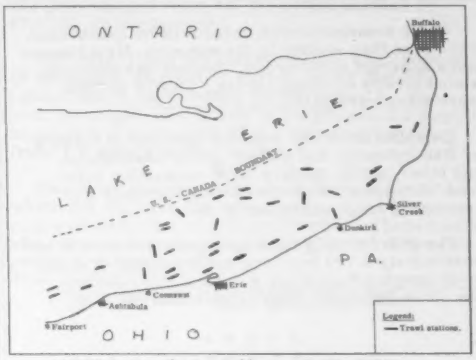
Exploration and Gear Research

EXPLORATORY FISHING IN LAKE ERIE CONTINUED:

M/V "Active" Cruise 4: To study the commercial availability of smelt and other fish stocks in Lake Erie, the U. S. Bureau of Commercial Fisheries chartered exploratory fishing vessel Active conducted surface scouting and echo-sounding operations on Cruise 4 (August 3-17, 1959). The vessel operated between Conneaut, Ohio, and Buffalo, N. Y.

During the cruise, 35 exploratory drags were made in the 5- to 25-fathom depth range using a 50-foot two-seam balloon trawl with a 1½-inch mesh cod end. Catches of smelt in eastern Lake Erie ranged from trace amounts to 150 pounds per tow. The majority of smelt in this area were 30 to 35 to the pound. Some large smelt, 12 to 18 to the pound, were also taken. Small amounts of spot-tail shiners, emerald shiners, white bass, white suckers, sheepshead, and yellow perch were taken in the shallow-water drags. Several tows at "standard stations" in the area visited during Cruise 3 produced catches up to 500 pounds of smelt, 12 to 18 to the pound. One commercial fisherman took trawl catches up to 1,500 pounds of smelt per day from this area.

Numerous large surface schools of small emerald shiners were observed. No seine sets were attempted.



M/V Active Cruise 4, (August 3-17, 1959).

Surface temperatures recorded during the cruise showed little variation--from 74° F. to 75° F. Bottom temperatures ranged from 41° F. at 25 fathoms to 74° F. at 5 fathoms. Thermal stratification was well defined throughout the Eastern basin.

Great Lakes Fishery Investigations

WESTERN LAKE ERIE BIOLOGICAL RESEARCH CONTINUED:

M/V "George L." Cruise 6, August 1959: Young yellow pike (walleye) 7-9 inches long were taken by gill net or trawl at all 7 stations in the western basin of Lake Erie by the U. S. Bureau of Commercial Fisheries research vessel George L. during the regular summer cruise. Young yellow perch were taken in large numbers--often more than 500 per 10-minute haul--in all areas and were the most abundant fish in the trawl catches. Young white bass and spot-tail shiners were caught in larger numbers and were more widely distributed than young sheepshead, emerald shiners, trout-perch, alewife, and gizzard shad.

Few adult commercial fish were taken by trawl. Yellow perch catches were lower than previously in the year. Catches of sheepshead and channel catfish were light.

The catch of fish in overnight sets of "canned" gill nets little resembled trawl catches in the same area at the same time. Large numbers of yearling gizzard shad were taken at most stations by gill net--few were taken by trawl. Several dozen adult yellow pike were caught by gill net at one station 10 miles north of Monroe. Only one other large yellow pike was seen during the entire cruise. The catch of adult perch in gill nets was light.

Surface water temperatures ranged from 79° to 81° F. and only a few degrees separated surface and bottom temperatures. Oxygen content appeared normal at all depths.

Water transparencies, measured by Secchi disc, were less than earlier in the summer. Algal blooms were apparent in all areas. Bottom samples consisted mostly of midge larvae. Mayfly nymphs were taken rarely.

Examination of the stomach contents of the larger fish indicated that yellow perch, sheepshead, and other bottom feeders were consuming little food. Predator fish were feeding normally and consuming large quantities of fish.

The gill-net gang used during the cruise was approximately 1,700 feet long and consisted of mesh sizes ranging from 1¼ to 5 inches.

Note: Also see Commercial Fisheries Review, October 1959, p. 29.

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WESTERN LAKE SUPERIOR FISHERY SURVEY CONTINUED:

M/V "Siscowet" Cruise 4, July 27-August 4, 1959: Midsummer environmental conditions were studied at three index stations located (1) southeast of Stockton Island, (2) northeast of Bear Island, and (3) east of Pike's Bay. In addition to the fishery and environmental studies at the index stations, trawl and gill-net operations were conducted north of Little Girl's Point and extensive explorations were made by trawling from a small boat and with a 25-foot, ½-inch-mesh seine along the shores of Stockton Island.

Standard gill-net gangs (1-inch to 5-inch mesh by ½-inch intervals) were fished. Trawl tows were made at each station with a 30-foot, semi-balloon trawl. Water samples for chemical analyses, and plankton and bottom samples were collected. Water temperatures at each index station and Secchi-disc readings and observations of currents were recorded.

Gill nets set southeast of Stockton Island in 21 to 25 fathoms took 7 lake trout, 40 whitefish, 6 menominee whitefish, 66 lake herring, 19 L. hoyi, 8 L. zenithicus, and 2 L. kiyi. The herring and L. hoyi were extremely difficult to identify in this catch. The fact that the 2 species were observed spawning together in this location during the fall of 1958 suggests the possibility of hybridization. Further studies of this problem are scheduled.

Trawl tows southeast of Stockton Island took small numbers of lake trout, whitefish, lake herring, smelt, pygmy whitefish, ninespine stickleback, and slimy muddlers. At this station the surface temperature was 69.8° F.; bottom temperature was 40.6° F.

Gill nets set northeast of Bear Island in 45 fathoms took 157 L. hoyi, 10 L. kiyi, 4 L. zenithicus, and 3 lake herring. Small numbers of smelt and burbot also were captured.

Trawl tows northeast of Bear Island took 37 L. hoyi and 4 L. zenithicus. At this station the surface temperature was 63.5° F.; bottom temperature was 39.6° F.

Gill nets fished east of Pike's Bay in 19 fathoms took 8 lake trout, 8 lake herring, 57 smelt, 176 L. hoyi, 4 L. zenithicus, and 1 burbot.

Two trawl tows at this station took 18 lake trout, 73 L. hoyi, 138 smelt, 1 pygmy whitefish, 1 L. zenithicus, 41 slimy muddlers, and 6 ninespine sticklebacks. The lengths of the trout ranged from 5.1 to 12.1 inches; 10 of the trout were fin-clipped. At this station the surface temperature was 68.5° F; bottom temperature was 42.4° F.

A standard gang of gill nets set in 25 fathoms north of Little Girl's Point took mainly L. hoyi and L. zenithicus but included 2 lake trout and 8 lake herring. Four 10-minute trawl tows at 15, 18, 20, and 27 fathoms took predominately smelt and small, unidentified coregonids. Four small trout were taken at 18 and 20 fathoms. The surface temperature in this area was 70.8° F.

The outboard motor boat conducted trawling operations in shallow waters just off the shores of Stockton Island. Tows were made in midafternoon and again after dark to compare catches from day- and nighttime fishing.

The catch in tows made during the day was very light and consisted mainly of smelt, slimy muddlers, menominee whitefish, trout-perch, johnny darters, and ninespine sticklebacks. Largest numbers of fish were taken on the same grounds at about 11:00 p.m. The longnose dace and northern lake chub were captured in addition to the species taken during the day.

Night trawling by the Siscowet in this area was hampered by rough and dirty bottom. Two 10-minute hauls took 4 lake trout, 2 L. hoyi, 2 pygmy whitefish, 1 menominee whitefish, 170 slimy muddlers, and 50 ninespine sticklebacks.

A 25- by 6-foot, ½-inch-mesh seine was hauled along the shoreline of Stockton Island. The catch from one haul made in the afternoon consisted of 1 slimy muddler. A haul in the same area after dark took over 200 fish, mainly ninespine stickleback, muddlers, and northern lake chubs.

The surface temperature during these operations was 70.0° F.

Cruise 5, August 10-22, 1959: Studies were conducted at Isle Royale, Mich., Thunder Bay, Ont., and the Apostle Islands, Wis., during this cruise. The stations worked are located as follows:

Isle Royale: north of Thompson's Island; Grace Harbor; southeast of Menagerie Island; south of Mott Island; Rock Harbor; northeast of Amygdaloid Island; south of Rainbow Cove.

Thunder Bay: between Pie and Welcome Islands; north of Welcome Island.

Apostle Islands: south of Stockton Island.

The primary objectives of this cruise were to sample various populations of coregonids in the Isle Royale, Thunder Bay, and Apostle Island regions for purposes of identification and comparison, and to sample various populations of lake trout in the Isle Royale region to compare their relative

abundance with last year's catch and to tag and release live specimens to learn their movements within the lake.

With the exception of the station established in Rock Harbor, gill nets were fished at each location. Trawling was attempted only south of Mott Island and in Rock Harbor.

One 15-minute trawl tow south of Mott Island in 62 fathoms yielded 2 species of sculpins (deepwater sculpin and spoonhead muddler), 15 L. zenithicus, 1 L. hoyi, and 1 smelt.

A 14-minute tow in Rock Harbor took about 100 pygmy whitefish, 1 trout, 3 herring, 1 smelt, 1 burbot and 7 slimy muddlers.

Gill-net catches varied considerably with location and depth of set. The gangs were made up mostly with small mesh nets ($1\frac{1}{4}$, 2, $2\frac{1}{4}$, $2\frac{1}{2}$, 3, $3\frac{1}{2}$-inch mesh). One 6-inch mesh net was attached to the gang in search of large trout and whitefish.

Of the 362 trout captured by gill net in sets made in the Isle Royale area, 149 were tagged with "spaghetti" tags and were released. Approximately 100 chubs were preserved in formaldehyde for laboratory examination.

Five bull nets (gill nets 300 feet long and 20 feet deep) were fished in an oblique set in Grace Harbor (20 fathoms). This set took 162 herring which were distributed almost uniformly from the surface to the bottom. Several of the herring appeared to be nearly ripe. A few L. zenithicus were also taken in this set and several of them also appeared to be nearly ripe.

Three gangs of two nets each ($2\frac{1}{4}$, $2\frac{1}{2}$-inch mesh) were set in Thunder Bay in search of Leucichthys reighardi dymondi, a subspecies reported to exist along the north shore of Lake Superior, but about which very little is known. The catch from these three gangs consisted mainly of longnose suckers, lake herring, and chubs which were not immediately identified. Many of the herring had the extremely deep bodies and short snouts attributed to Leucichthys artedi albus. This nominal subspecies is common to Lake Erie and has been previously reported in bays of Lake Superior. Many specimens of both lake herring and chubs were preserved.

A gang of 6 small-mesh nets were set at 50 fathoms south of Stockton Island. About 225 chubs were taken, most of them L. hoyi and L. zenithicus. Several of these specimens were frozen and later compared with like species from Isle Royale and from eastern Lake Superior.

The surface temperature at Isle Royale varied from 60.8° F. in Grace Harbor to 56.2° F. north of Thompson's Island. In Thunder Bay the surface temperature ranged from 58.4° to 60.5° F. South of Stockton Island the surface temperature was 64.9° F.

Officials of the U. S. Park Service, Isle Royale, Mich., requested that the Bureau biologists set gill nets in Siskiwit Lake in search of lake trout reportedly to be scarred by the sea lamprey.

On August 12, 1959, two 300-foot gill nets ($1\frac{1}{2}$-, $4\frac{1}{2}$-inch mesh) were set WNW. of Ryan Island in water 72 to 112 feet deep. Water temperatures on this date ranged from 69° F. on the surface to 47.0° F. on the bottom.

The nets, lifted the following day, had captured 36 whitefish, 29 trout, 7 burbot, and 2 Siskiwit Lake cisco, Leuchichthys bartletti Koelz. The trout averaged 22.2 inches in length and 3.1 pounds in weight. The lengths of the whitefish ranged from 7.6 inches to 22.1 inches.

One trout showed evidence of three old scars which did not have the appearance of sea lamprey scars as seen on Lake Superior trout. These small, shallow scars suggest the possibility of native lampreys in Siskiwit Lake.

Note: Leuchichthys hoyi, L. kiyi, L. zenithicus--species of chubs. Also see Commercial Fisheries Review, October 1959, p. 28.

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SURVEY OF SOUTHEASTERN LAKE SUPERIOR CONTINUED:

M/V "Cisco" Cruise 4: Work during Cruise 4 of U. S. Bureau of Commercial Fisheries research vessel Cisco was carried out in the Shelter Bay-Marquette-Keweenaw Bay area of southeastern Lake Superior. Much of the fishing effort was identical to that of Cruise 2, both as to area and gear.

Regular gangs of gill nets (150 feet each of $1\frac{1}{4}$- and $1\frac{1}{2}$-inch mesh, 200 feet of 2-inch mesh, and 300 feet each of $2\frac{3}{8}$-, $2\frac{1}{2}$-, 3-, $3\frac{1}{2}$-, 4-, $4\frac{1}{2}$-, 5-, $5\frac{1}{2}$-, and 6-inch mesh) were set overnight at 14 fathoms in Shelter Bay; 20, 25, 35, 50, 75, and 100 fathoms off Marquette; and 25, 35, 50, and 80 fathoms in Keweenaw Bay. A total of 24 lake trout was caught (1 in Shelter Bay; 9 at 25 fathoms and 2 at 35 fathoms off Marquette; and 11 at 25 fathoms and 1 at 35 fathoms in Keweenaw Bay). Of these, 13 were marked with spaghetti tags and released. Chub catches off Marquette were light (none at 20 fathoms, 12 at 25 fathoms, 42 at 50 fathoms, and 48 at 100 fathoms) except at 75 fathoms where 126 were taken, the catch at 50 fathoms was appreciably smaller than during Cruise 2. Leucichthys reighardi was the most abundant chub and L. hoyi second most common in the 25-, 35-, and 50-fathom sets off Marquette, and L. kiyi was most abundant in the deeper nets. L. nigripinnis and L. zenithicus were not numerous in any sets. In the Keweenaw Bay area chub catches at 25 fathoms (124), 35 fathoms (227), and 50 fathoms (265) were heavier than during Cruise 2, mostly because of an increase in the number of L. hoyi, which dominated the catches at these depths. At 80 fathoms, however, the 22 chubs taken were fewer than in Cruise 2. Lake herring were scarce in most sets, but 53, averaging 1 pound each, were caught in Shelter Bay where only 4 were netted during Cruise 2. Other species in the gill nets were burbot (a few in several sets off Marquette, none in Keweenaw Bay), and smelt (common only at 25 fathoms in Keweenaw Bay).

Trawls were towed at 100 fathoms northwest of Grand Island, at 50 fathoms off Marquette, and at

several depths from 12 to 25 fathoms in Shelter Bay, 7 to 20 fathoms south of Traverse Island in Keweenaw Bay, and 20 to 45 fathoms off Pequaming in Keweenaw Bay. A single 20-minute tow off Grand Island brought up 141 deep-water sculpins, 1 slimy sculpin, 2 L. reighardi, and 2 L. kiyi. Fairly large numbers of slimy sculpins, and an occasional spoonhead sculpin, smelt, pygmy whitefish, and ninespine stickleback made up the catches in Shelter Bay. No 0-age class lake trout were netted, as has been the case all this year. The tows off Marquette yielded moderate numbers of slimy sculpins and deep-water sculpins, a few L. reighardi and L. hoyi, and a single burbot. The catches off Traverse Island consisted mostly of slimy sculpins and ninespine sticklebacks, except at 7 fathoms where 231 yearling smelt were taken in a 10-minute tow. Off Pequaming in Keweenaw Bay, 44 lake trout between 5 and 10 inches long were caught. Only one was naturally spawned, the others having been stocked in the Bay about 6 weeks previously. The lake trout were most abundant at 33-36 fathoms. Other species in these tows were slimy sculpins, ninespine sticklebacks, smelt, pygmy whitefish, L. hoyi, and L. reighardi. All except smelt were considerably less common than during Cruise 2.

Half-meter nets with large plankton mesh were towed for fish fry in most of the areas visited. Very few fish fry were netted except in Keweenaw Bay and in shallow water (12-16 fathoms) near Marquette. In the latter area smelt fry were at midlevels and an unidentified species, possibly L. reighardi, near the surface.

Limnological stations in Shelter Bay, Keweenaw Bay, and off Big Bay Point were visited. Surface water temperature had risen, by the end of the cruise, to about 18° C. (64.4° F.) for several miles out from shore, and to about 15° C. (58.0° F.) 20 miles off Marquette. Extremes were 11.5° and 20.7° C. (52.7° and 69.2° F.). Thermal stratification was noted in all areas, but there were few occasions when there was a sharp thermocline.

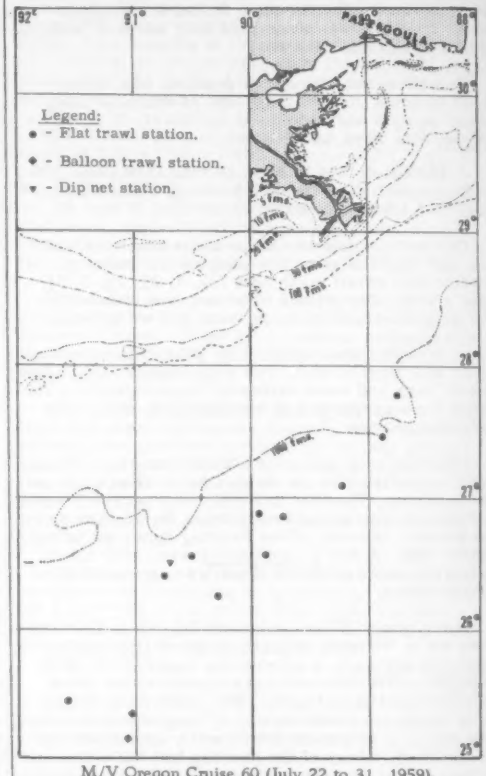
Note: Also see Commercial Fisheries Review, September 1959 p. 32, and October 1959 p. 27.

Gulf Exploratory Fishery Program

EXPERIMENTAL DEEP-WATER TRAWLING IN THE CENTRAL AND NORTH-CENTRAL GULF OF MEXICO:

M/V "Oregon" Cruise 60: To obtain more data on deep-water fishing techniques with commercial trawls, the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon made a 9-day cruise to the Central and North-Central Gulf of Mexico. During the cruise that ended on July 31, 1959, 12 bottom tows were attempted in depths ranging from 850 to 1,850 fathoms using 40-foot flat and 30-foot balloon trawls. The principal purpose was to determine the wire size-length ratio for given vessel or current speeds.

Six drags were "successful" in that the trawl reached bottom and returned to the surface without damage or fouling. Three drags were water hauls, two



M/V Oregon Cruise 60 (July 22 to 31, 1959).

resulted in tear ups, and one net was lost. From the appearance of the net and trawl doors, there is some question as to whether the gear was functioning properly on the "successful" hauls. The largest fish catch, which amounted to 25 pounds of mostly large brotulids and macrourids, was made in 850 to 1,100 fathoms. Several species of penaeid shrimp were caught at all depths fished, but in very small numbers. Largest of these have been tentatively identified as Aristaeomorpha and Plesiopenaeus. Several large nonpenaeids were taken in small numbers, including Notostomus and Acanthephyra.

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LAMPARA SEINE TESTED ON FISH SCHOOLS ALONG MISSISSIPPI COAST:

M/V "Oregon" Cruise 61: In an attempt to obtain commercial quantities of fish from schools along the coast of Mississippi, the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon tested a lampara seine during a 14-day cruise that ended on September 2, 1959.

A standard 33 by 7-foot menhaden purse boat with 48 hp. engine and equipped with a 2-roller hydraulic gurdy, was used to set and retrieve the seine. Five daylight sets were made using the one boat method. Four daylight and six night sets were made using a 20-foot seine skiff with the purse seine boat, each boat carrying one wing. Night sets were made on fish attracted to lights from a $2\frac{1}{2}$ kw. generator in a light skiff.

Visual spotting from the vessel was used for location of school fish. Steady moderate to fresh winds prevailed throughout the cruise, and no concentrated schools were located. Small catches were made of menhaden (Brevoortia), razorbellies (Harengula), Spanish mackerel (Scomberomorus), ladyfish (Elops), anchovies (Anchoa), and croakers (Micropogon).

Night sets were made on fish attracted by one 1,500-watt light; two lights, 1,500 watts and 750 watts; and two 750-watt lights. Variations noted were: fish attracted with lower intensity lights would be frightened when the 1,500-watt light was turned on; and small fish were attracted more readily with larger fish staying in the "shadows."

* * * * *

UNDERWATER MOTION PICTURES TO EVALUATE SHRIMP TRAWLS IN ACTION:

M/V "George M. Bowers" Cruises 20, 21, and 22: A series of cruises have been made by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel George M. Bowers to study shrimp trawls in action with underwater motion picture cameras. The studies are planned to give a complete and detailed underwater picture of shrimp trawls while fishing under a wide range of conditions.

A major objective will be to evaluate the effectiveness of different types of shrimp trawls and their many modifications used by the shrimp industry. A further objective will be to prepare a series of detailed motion picture films on the various trawls for loan to fishermen, net makers, and other interested groups.

Bureau's exploratory fishing vessel George M. Bowers.

The studies are under way along Florida's west coast, between Panama City and Dry Tortugas, and in the Bahamas. Those areas were chosen because of the clear water and suitable bottom conditions. Future studies of trawls on actual shrimp fishing grounds will be made if water conditions are found to be suitable for underwater photography.

Cruises 20, 21, and 22 have provided 8,200 feet of underwater film. Present

plans call for about two years of work to complete the studies.

Massachusetts

AMENDS LAW REGULATING STORAGE AND TRANSPORTATION OF FROZEN FOOD:

The State of Massachusetts on July 17, 1959, amended a law that regulates the storage and transportation of all types of frozen foods, including fishery products.

The law as approved, reads:

"Chapter 94 of the General Laws is hereby amended by inserting after section 73 under the caption FROZEN FOOD the following section:--Section 73A. No person engaged in the business of storing frozen food or transporting such food shall store or transport such food within the commonwealth unless it is stored or transported under refrigeration which shall insure good keeping qualities and under temperatures and holding conditions approved by the director of the division of food and drugs of the department of public health. Said director may, after public hearing, make regulations for the storing and transportation of frozen food, including temperature control, sanitation and other matters, in accordance with recognized standards necessary for the protection of the public health and the preservation of such food in wholesome condition. The term 'frozen food,' as used in this section shall include food of any kind which has been preserved by a process of f r e e z i n g. Nothing in this section shall be construed to apply to delivery of such food by a retailer to the purchaser.

"Whoever violates any provision of this section or of any regulation made hereunder shall be punished by a fine of not more than one hundred dollars for the first offense, and not less than one hundred dollars nor more than five hundred dollars for each subsequent offense."

Mussels

TENNESSEE RIVER POPULATION STUDIES:

Surveys of the fresh-water mussel populations of the Tennessee River indicate that this important commercial resource has been drastically depleted in recent years. Little is known of the life history of the predominant species of these populations, the pigtoe mussel, Pleurobeme cordatum. If populations of this species are to be restored, knowledge of its cycle, growth, and ecology must be acquired.

In 1958 the U. S. Bureau of Commercial Fisheries Pensacola (Fla.) Laboratory began experiments at the Tennessee Valley Authority's abandoned Elk River Fish Hatchery in Limestone County, Ala., to propagate the pigtoe mussel.

Methods of propagation are based upon a peculiar feature of the normal course of development of fresh-water mussels. The very young mussels when first freed from the incubation pouches of the parent, with rare exception, must become parasitic upon fish in order to pass through the next stage of their existence. Therefore, if an opportunity occurs after liberation the young mussels or glochidia, as they are called in this stage, attach themselves to the gills, fins, or scales of a fish. The mussels of economic importance attach themselves almost exclusively to the gills. In attaching to or biting on the fish, a slight wound seems to be caused, which begins at once to heal over; but in the process of mending the glochidium is overgrown and, enclosed within the tissues of the fish. The mussel is then an internal parasite and remains in this condition for about two weeks. When the proper stage of development is reached, it frees itself from the host and falls to the bottom. If it finds suitable lodgment it continues its growth to form an adult mussel. Mussels do not attach to fish indiscriminately; for each species of mussel there is a limited number of species of fish which may serve as host.

National Fish Week

PRESIDENT EISENHOWER'S MESSAGE TO FISHING INDUSTRY:

On September 12, 1959, President Dwight D. Eisenhower sent the following message to the National Fish and Seafood Committee:

"The White House,
Washington, D. C., Sept. 12.

"F. M. Bundy, Chairman, National Fish and Seafood Week Committee, 1614 Twentieth St., N. W., Washington, D. C.

"You have told me of the National Fish and Seafood Week Committee's plans for the fifth annual observance of Fish and Seafood Week.

"Commercial fishing has long made a vital contribution to our people's diet and to the National economy. As our population continues to grow, we will rely to an increasing extent on the bounty of the sea.

"On this occasion, it is a pleasure to salute the men and women of the American fishing industry.

"/s/ Dwight D. Eisenhower"

This year's "Fish 'n' Sea Food Parade" promotion took place October 12-25.

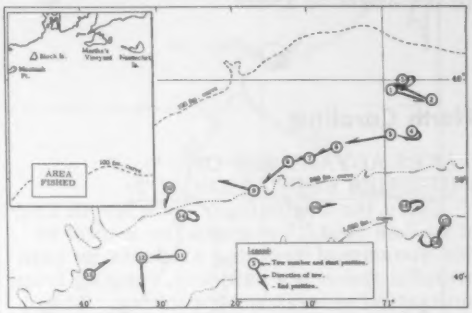
Note: Also see Commercial Fisheries Review, August 1959, front cover and back cover.

North Atlantic Fisheries Exploration and Gear Research

DEEP-WATER TRAWLING SUCCESSFUL:

M/V "Delaware" Cruise 59-10: Successful deep-water exploratory trawling was conducted along the continental slope by the U. S. Bureau of Commercial Fisheries research vessel Delaware August 24-29, 1959. Eighteen tows were made during the cruise with the net on the bottom during all except the first two tows. Tows were made at successive depths from 200 fathoms to beyond 1,000 fathoms, spaced at approximately 100-fathom intervals.

A 40-foot Gulf shrimp net, spread by 5-foot chain-bridle shrimp doors, was used on all experimental tows. The doors



M/V Delaware Cruise 59-10 (August 24-29, 1959).

were towed by a 14-fathom bridle from a single warp. The first 400 fathoms of the warp consisted of $\frac{1}{2}$-inch wire; the remaining 1,450 fathoms was $\frac{3}{4}$-inch wire. Fishing was conducted on the starboard side from the after gallows.

The main fishing problem experienced with this experimental gear in such deep water was snarling of the net. A large percentage of snarls apparently occurred while setting out, but indications are that this problem can be resolved. No gear loss was reported and little damage to the nets was incurred.

Information concerning the depth ranges of some of the deep-water fauna was gained. The American hake (Merluccius albidus) and long-finned hake (Urophycis chesteri) were found to be present to a depth of approximately 500 fathoms. Thirty pounds of each were taken at Station 9 in a depth of 485-520 fathoms. The common rat-tail grenadier (Macrourus bairdii) occurred in all depths fished. Lobsters (Homarus americanus) were found to occur in depths to 300-350 fathoms. The red crab (Geryon quinquedens) was found from the lower depth range of the lobsters to 1,040 fathoms--the greatest depth reached.

Night-light collections were made, and several rare specimens were collected by cooperating personnel from

the U. S. National Museum, Washington, D. C. In cooperation with the Woods Hole Oceanographic Institution, 342 drift bottles were released from 57 stations to assist in an oceanographic program designed to investigate current patterns in the offshore areas.

North Carolina

TAKES ADVANTAGE OF FISHERIES EDUCATION ACT:

Since the beginning of 1959 North Carolina has held 37 classes for a total of 552 vocational-training students on commercial fisheries subjects, ranging from navigation to crab meat picking. The program has been established with funds provided by the Fisheries Education Act of 1956 and administered by the U. S. Department of Health, Education, and Welfare and matching funds from the State.

North Pacific Exploratory Fishery Program

CHUKCHI SEA IN NORTHWEST ALASKA SURVEYED FOR ATOMIC ENERGY COMMISSION:

M/V "John N. Cobb" Cruise 43: As part of a cooperative program between the U. S. Bureau of Commercial Fisheries and the Division of Biology and Medicine of the Atomic Energy Commission, the Bureau's exploratory fishing vessel John N. Cobb surveyed the resources and commercial potential of the Chukchi Sea during an 8-week cruise that ended on September 11, 1959.

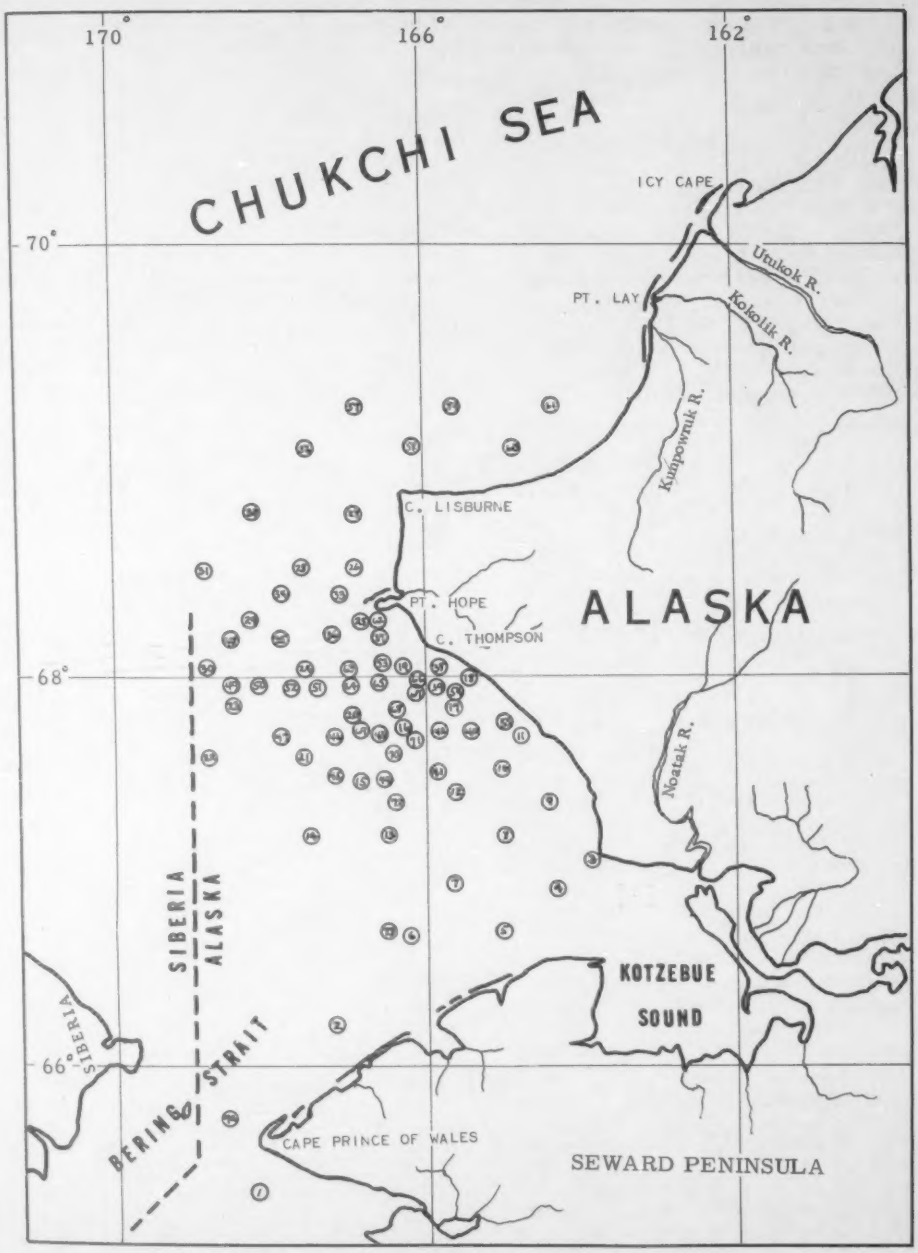
The objectives of this cruise were to determine the types, quantity, and distribution of marine fish and shellfish in the region; to investigate their commercial potential; and to assist the Commission in determining the biological cost of the detonation of nuclear devices in that area. The commission is tentatively planning an experiment in harbor excavation near Cape Thompson, Alaska, as part of the over-all Commission program for developing peaceful uses for atomic energy.

During the investigation the vessel cruised in excess of 8,000 miles, 2,500 of which were in the Chukchi Sea. The investigations were carried out in the area from Bering Strait to Cape Lisburne in Northwest Alaska. A total of 59 otter-trawl drags, 36 biological-dredge hauls, and 12 midwater-trawl hauls were made. In addition, investigations were made with gill nets, traps, and a beach seine. Extensive surveys also were made using fish-detecting devices to determine availability of pelagic fishes.

No commercial quantities of bottom fish were taken during the investigation in the Chukchi Sea area. Sole taken in the area appeared to be much smaller than those taken on commercial grounds to the south. One set with a gill net near the Cape Thompson blast site, produced 1,000 herring approximately 10 inches in length. This represented the only catch that indicated possible commercial abundance of pelagic fish in the area. Other hauls made with the midwater trawl and gill nets were not productive.

An extremely rich and varied invertebrate fauna, taken during the investigation, may represent one of the finest collections ever made in Arctic waters. Although no commercial quantities of shellfish were captured, the collections will greatly contribute to the knowledge of animal distribution in Arctic waters. Sighting of mammals in the Arctic waters was not frequent, but several large herds of California grey whales were noted southwest of the Eskimo village at Kivilina, Alaska. The grey whales were noted on four different occasions in the same general region.

Personnel from the Laboratory of Radiation Biology and the College of Fisheries of the University of Washington sampled and monitored fish, shellfish, and bottom deposits throughout the area to determine the extent of background radiation present. Analysis of these data will be continued at the University, and subsequent reports on these findings will be released by the Atomic Energy Commission. Oceanographic



M/V John N. Cobb station pattern of Cruise 43 (July-September 1959).

data were collected throughout the investigation. This information will supplement data collected by the University of Washington oceanographic vessel Brown Bear.

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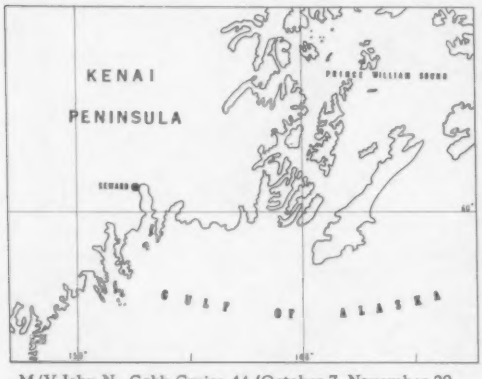
SHRIMP RESOURCES OFF NORTH-CENTRAL COAST OF GULF OF ALASKA TO BE SURVEYED: M/V "John N. Cobb" Cruise 44: The shrimp resources in the waters along the north-central coast of the Gulf of Alaska will be surveyed by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb. During the October 7-November 20 trip, the vessel



M/V John N. Cobb Cruise 44 (October 7-November 20, 1959).

will explore in bays, inlets, and offshore waters along the Kenai Peninsula from Nuka Bay to Prince William Sound. The objectives will be to determine the distribution, varieties, abundance, and sizes of shrimp during the fall season in that area. Oceanographic and meteorological data will be collected to evaluate possible affects on shrimp distribution. Commercial-type Gulf of Mexico flat shrimp trawls will be used for the exploratory fishing.

This is the tenth Alaska shrimp resources survey carried out by the Bureau since 1950. Cruises in 1957 and 1958 revealed extensive shrimp beds in the Shumagin Islands, Kodiak Island, and Kachemak Bay areas. Last year's findings in the latter two areas are being profitably exploited. The work planned for this fall will provide information from an area not previously explored. The location of productive shrimp grounds between Nuka Bay and Prince William Sound would considerably aid shrimp fishing activities recently started in the Seward area.

Oysters

LONG ISLAND SOUND SPAWNING AND SETTING OF OYSTERS AND STARFISH: Regular observations on the occurrence and distribution of shellfish larvae at several Long Island Sound stations, where 200-gallon samples are taken at semiweekly intervals, have shown that since the issuance of the last bulletin, on August 4, the situation has remained virtually the same being characterized by small numbers of bivalve larvae and practically a total absence of oyster larvae. For example, on August 6 no oyster larvae were found in any of the samples. On August 10 the situation was generally unchanged. Two oyster larvae were found at one station, but the total number of bivalve larvae remained low at all stations. Perhaps the finding of a few empty bivalve shells, particularly at one Station, and the fact that several larvae looked as though their shells were partly empty are significant. Possibly these observations indicate mortality or some abnormal condition of the larvae.

For the first time this year mature oyster larvae were found in one of the plankton samples taken on August 13 at one station located in the Milford area. This sample contained four mature larvae. In addition, there were about 3 or 4 smaller larvae. Again this year mature oyster larvae appeared suddenly as though brought in by the currents from other areas not covered by the plankton sampling. It is also important that the plankton sample from one station, collected on August 13, contained not only mature oyster larvae but it also had the highest total number of bivalve larvae and the highest number of species of bivalve larvae seen in any of our samples since July 13. (Observations on Spawning and Setting of Oysters and Starfish in Long Island Sound, Bulletin No. 3, Fishery Biological Laboratory, U. S. Bureau of Commercial Fisheries, Milford, Conn., August 18.)

The first oyster set occurred on August 11. It was extremely light and was recorded only at two stations. This is one of the latest beginnings of setting recorded in the course of the U. S. Bureau of Commercial Fisheries studies, which has extended for a period of about 25 years. Apparently, the larvae that were developed from local spawn either died or were carried away by currents. The larvae were absent from our waters regardless of the observations that the oysters in New Haven Harbor had developed a large quantity of spawn and that the majority were almost completely or more than half spawned by August 6, thus indicating that large numbers of eggs were released. On the other hand, we know that spawning will continue because many oysters at the deeper stations in the Bridgeport area still contain appreciable quantities of spawn and some of them appear to be ripe but unspawned.

Setting of starfish continued, but its intensity remained light. Again, two stations in the Bridgeport area displayed the heaviest set. However, except for the period from August 3 to August 6, when 30 young starfish were recorded on 40 shells at Station 9, the number of starfish per collection period did not exceed ten per station.

The beginning of setting of oysters has been delayed not only in Long Island Sound proper but also in adjacent waters. According to the biologist of the Oyster Institute of North America, who in cooperation with the Bureau is conducting studies on the utilization of salt-water ponds for oyster culture, and who also carries on observations in the open waters of Long Island, the first oyster

set was recorded about August 12 on collectors placed at a depth of approximately 30 feet, north of Paradise Point in Southold Bay. No oyster larvae were previously seen in semiweekly plankton samples nor were any spat discovered on the collectors from that area until the above-mentioned date.

Another oyster enemy, the flatworm of the genus Stylochus, appears to be showing a rapid increase in numbers in Long Island Sound waters. We called attention to this predator in one of our 1956 papers and since then our biologists have observed its occurrence and behavior in several locations. This year in one of our experiments in Milford Harbor, where laboratory-grown oyster set was used, over 30 percent of the young oysters, in some instances, were found dead with the worms still inside of the shells.

In the near future the Bureau's laboratory, in cooperation with biologists of other groups of the Bureau of Commercial Fisheries and the Connecticut Shell Fish Commission, will begin a series of studies devoted to observations on the behavior of starfish under normal conditions and to the development of chemical methods to control them. Several biologist-SCUBA divers of the Bureau and an underwater television technician of the Woods Hole Biological Laboratory are helping. The State Shell Fish Commission is also cooperating by offering the oyster-spawning bed in the Milford area for these studies and the use of the State boat Shellfish. Note: Also see Commercial Fisheries Review, October 1959, p. 35.

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STUDIES IN MARYLAND AND CONNECTICUT:

Maryland: The research of the U. S. Bureau of Commercial Fisheries Annapolis (Md.) Fishery Biological Laboratory is centering this year on the pattern of oyster setting in horizontal and vertical levels in a seed area of southern Maryland. Early indications are that the setting will be light and not of commercial significance in the experimental area. Evaluating the effect on oyster seed of a predatory flatworm, Stylochus ellipticus, recently found in these waters, is a part of the project. The occurrence of the worm was also light this summer.

Hydrographical and biological observations are being conducted in the waters surrounding the Oxford, Md., Laboratory site. The oyster-setting portion of these observations showed light spatfall during July. This, however, is a condition observed elsewhere in Maryland waters and indicates a general light setting this season.

Connecticut: Observations on spawning and setting of oysters and starfish in Long Island Sound began in July. Setting of starfish began July 2 and is continuing; however, it is not too heavy. No setting of oysters has been recorded. Although spawning occurred long ago, practically no oyster larvae have been found in the plankton samples.

In developing methods of larval culture of commercial mollusks several more antibiotics were evaluated on their ability to control undesirable bacteria that cause larval diseases. Achromycin, a preparation of tetracycline, gave promising results.

About 3.5 million oyster larvae were reared to the setting stage and released in experimental ponds.

Experiments on developing chemical barriers to control shellfish enemies made good progress.

* * * * *

USE OF PLASTIC SHEETS FOR CONVERSION OF SOFT, MUDDY BOTTOMS INTO OYSTER BEDS:

Many bottom areas and estuarine regions are too soft to support oysters or their shells. To convert these areas into oyster beds thousands of bushels of oyster shells have to be planted on each acre to harden the bottom. This an expensive undertaking, rendering the method virtually impractical. Nevertheless, problems of this nature have to be met in extensive areas along our coast when establishment of oyster beds is desirable in regions where the bottoms are too soft.

The problem can be solved by covering soft bottoms with a thin sheet of polyethylene or some other plastic material to serve as a support for oyster shells, other set collectors, seed oysters, or spawners. Some plastics are neutral, virtually indestructible materials which last many years. We have used polyethylene for years in our experiments and have found it extremely durable. It is inexpensive--sheets costing less than one cent per square foot if purchased in large quantities.

In the spring of 1958 an experiment was undertaken on the mud flats in Milford Harbor where a polyethylene sheet (6 mils thick and 20 feet wide) was spread on the bottom in such a manner that half of it was above and half below the mean

low-water mark (fig. 1). Soon after that, large quantities of oyster shells, loose and in special chicken-wire bags, were placed on the polyethylene. An extremely heavy set of oysters occurred on the shells resting on the plastic. This was also true for nearby areas, where oyster shells were resting directly on the bottom because of the unusually heavy oyster set that occurred that year in Long Island Sound and its tributaries. However, heavy setting on the shells placed directly on the plastic corroborated our earlier laboratory observations showing the lack of adverse effects of polyethylene on oyster larvae and set.

Continued observations indicated that the polyethylene sheet withstood seasonal changes very well and that even the severe winter of 1958/59, when the tidal flats froze frequently and large quantities of ice were formed in Milford Harbor, did not noticeably affect the plastic material. A year after the sheet was first placed in the water, the plastic showed no signs of deterioration and continued to support the heavy load of shells and oysters.

In addition to converting soft bottoms into usable ones, polyethylene sheeting can be used for still another purpose. For example, recent literature contains several remarks made by oyster biologists, especially the Japanese, concerning a gradual deterioration of good oyster bottoms after being used for some time. They ascribe this to the accumulation of molluscan waste products which gradually decompose, rendering the bottom toxic to oysters. Such areas could probably be restored to their former productivity by covering them with polyethylene sheeting or similar material, which would isolate oysters from the deleterious effects of polluted bottoms.

A polyethylene sheet serves as a support spread on soft, muddy bottom for oyster shells.

Still other uses of polyethylene sheeting suggest themselves. One, perhaps, is that of creating favorable conditions in specially-designed ponds and tanks for the cultivation of commercial species of sponges. The material can also be used for protecting the bottoms of oyster dikes and claires (small enclosed oyster ponds) from burrowing crustaceans, such as members of the genus Upogebia, and also for retaining the water in claires

built in areas where the natural soil is too porous.

Note: I wish to thank my colleagues, H. C. Davis and P. E. Chanley, for their help in establishing the experimental, plastic-covered bed in Milford Harbor.

-- V. L. Loosanoff, Director,
Biological Laboratory,
U. S. Bureau of Commercial
Fisheries, Milford, Conn.

Pacific Herring

AERIAL SPAWNING SURVEYS IN ALASKA:

The method of conducting Pacific herring spawning surveys on definite patterns by aircraft, which was instituted in 1957, was again used in the spring of 1959 in Alaska. Spawning beaches observed were charted during flights and miles of beach utilized for spawning computed.

During the aerial surveys from March 16 to May 19, 141.4 hours of flying time were expended and 20,170 miles of beach observed. Spawning was charted on 133.7 miles of shoreline. Insofar as spawning miles were concerned, the Ketchikan-Craig district accounted for 16.5 miles, the Sitka district 93.3 miles, and the Juneau district 24.1 miles. Calculations based on egg density, area, and herring fecundity indicate a minimum of 65,500 tons of herring contributed to the spawning observed.

Aerial spawning surveys were conducted in Prince William Sound also--12.9 miles of spawn were recorded. No surveys were conducted in Kodiak this year.

Ground surveys were made in 46 separate areas in southeastern Alaska and accounted for about 16 percent of all spawning observed.

Studies, conducted on subtidal and reef spawning in the Craig area, indicate it can be rather extensive.

Sardines

CALIFORNIA SARDINE CATCH DROP FORECAST FOR 1959:

Provided the tie-up over the ex-vessel price disagreement between producers and canners and other economic factors do not exert a depressing effect upon fishing operations, the California sardine landings during the 1959 season can be expected to be only slightly less than the 101,567 short tons landed in 1958. In 1957 only 20,455 tons were landed. This forecast was announced at a conference held in La Jolla, Calif., on July 28-30. The conference was attended by representatives from the California Department of Fish and Game, Scripps Institute of Oceanography, the U. S. Bureau of Commercial Fisheries, California Academy of Sciences, and Hopkins Marine Station for the purpose of reviewing their contributions to the California Cooperative Oceanic Fisheries Investigations. Industry members and other government officials attended also.

The information developed by the California Department of Fish and Game suggests that without economic restrictions the catch in Southern California waters should be about 67,000 tons. About 27,000 tons could be caught off central California (north of Pt. Arguello). The total California commercial sardine catch could reach about 94,000 tons; however, economic factors and fleet tie-ups may keep the catch down.

The percentage age composition of the catch should be about as follows:

Area	Year-Class			
	1957	1956	1955	1954+
	(Percent)			
California:				
Southern	61	33	5	1
Central	64	36	-	-

The programs carried out by the U. S. Bureau of Commercial Fisheries suggest that the availability of sardines will be about the same as last year. This is judged because the amount of spawning and the distribution of spawning is about like last year, and there are no indications of outstanding year-classes entering the fishery. A note of caution must be injected, however, because of indications of cooling of the ocean to the north. A marked persistent cooling might cause the sardines to be further south than last year.

At Monterey, 4 out of 6 canneries settled with sardine fishermen on September 1 to pay $35 ex-vessel for sardines landed at Monterey on a trial basis for about a week. One small sardine canner at Oxnard also settled at the same price. But in southern California no agreement had been reached as of September 1. The central California season opened August 1 and the southern California season September 1, but the boats have been tied up at the dock pending the settlement of the ex-vessel price.

On September 2 about 360 tons of sardines were caught and delivered to the four canneries at Monterey that have agreed to pay $35 a ton. Fishermen reported fish plentiful in Monterey Bay with seiners catching large sardines packing 5 to 6 fish per pound can.

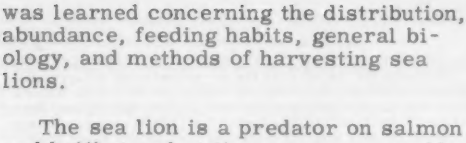
Sea Lions

ALASKA SEA LION STUDIES:

Biological studies on the sea lions in Alaska were conducted during the past three years by the Fishery Research Institute of Seattle under a contract from the U. S. Bureau of Commercial Fisheries. As a result of the research much

was learned concerning the distribution, abundance, feeding habits, general biology, and methods of harvesting sea lions.

The sea lion is a predator on salmon and halibut and at times causes considerable damage to fishing gear.



Sea lions on breeding grounds, Bogoslof Islands, Alaska.

Efforts were made this year to determine if their numbers might be reduced by initiating a commercial fishery for these animals. A total of 616 sea lions was killed and about 100 tons of sea lion meat and 18,000 pounds of livers were rendered. The meat is expected to be sold for mink feed or to canners of pet food.

The killing of the 616 sea lions was the result of a $50,000 contract awarded to a Pacific Coast fish-packing firm by the U. S. Bureau of Commercial Fisheries. The fishery company sent its freezership Arctic Maid for a two-months study near Kodiak Island and westward to the Aleutians.

Tuna

FROZEN TUNA TRANSFERRED FROM FISHING VESSEL TO CARGO SHIP AT SEA:

A United States west coast tuna-packing company made a trial transshipment of frozen tuna in Panama Bay off Taboga Island September 5, 1959. The chartered refrigerated cargo ship, Maria Horn, anchored some 200 yards off Taboga Island which has a protective deep-water cove. The company's two tuna vessels, the Westport with 230 tons and the Missouri with 240 tons of frozen tuna aboard, tied up alongside the Maria Horn, one aft and the other forward. Using ships' gear and cargo nets, the transfer of the frozen tuna was made without incident.

The open-sea transshipment is estimated to have saved the company some $2,000. A total of 48 stevedores from Panama City and 32 native laborers from Taboga Island were used in the operation. The wage scale paid was 90 cents an hour to the gang foreman, 75 cents an hour to winchmen, and 50 cents an hour to stevedores. Time-and-a-half was paid for Sunday work.

The company is studying the feasibility of operating its tuna fleet of 20 boats from a base on Taboga Island. The company would expect eventually to establish dock facilities and a freezing plant of some 2,500- to 3,000-ton capacity on the Island.

In 1956 a shrimp company initiated construction of a fish-meal plant on this sheltered cove of Taboga Island. It was the first of a three-stage program providing for a shipyard with dry docks, marine railroad and supply base, and a shrimp-freezing plant. The fish-meal plant was completed but operation has been limited for lack of an adequate fish supply. Further construction was deferred in view of the reversal in the Panama shrimp industry and the company's extension of operations to Ecuador. The United States tuna company would probably acquire the site of the shrimp company as building areas are limited on this small resort island. An adequate fresh-water supply is lacking. (United States Embassy, Panama, September 11, 1959.)

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UNITED STATES-JAPANESE GOVERNMENTAL TUNA CONFERENCE:

The U. S. Interior, State and Commerce Departments have indicated qualified approval of the tuna industry's proposal for government-to-government talks on tuna between the United States and Japan. The following letter, signed by representatives of the three government departments, was mailed towards the end of August 1959 to those concerned with the meeting in the United States:

"Representatives of the Departments of Interior, State and Commerce have examined with great care the plan of action for talks on tuna between the United States and Japanese Governments submitted on July 8 by representatives of the Southern California tuna industry. Equally careful consideration has been given to the views expressed by other representatives of the tuna industry and to statements submitted to the interested agencies subsequent to the meeting on July 8.

"The plan of action submitted on July 8 contained a recommended series of agenda items for the proposed tuna conference under the following headings: (1) conservation; (2) efficiency of harvesting; (3) quality of production; (4) efficiency of marketing; (5) market research and development; and (6) Japanese price and volume controls.

"The above mentioned Departments have concluded that certain objectives of the tuna industry might appropriately be sought and promoted by informal discussions between representatives of the United States and the Japanese Governments under the first five of these headings. It will, of course, be necessary to reach agreement on the details of an agenda.

"We have concluded, however, that it would not be desirable to include in any discussions between governments the subject of future Japanese price and volume controls. Japanese exports of fresh and frozen tuna and canned tuna to the United States are presently subject to unilateral controls. The proposed plan of action refers by implication to the fact that at the present time Japanese exports to the United States of certain types of cotton textiles are subject to voluntary controls at certain specific levels. It is apparently with this arrangement in mind that the plan of action refers to the establishment of a precedent for industries other than tuna similarly affected by Japanese imports. It is true that this Administration has discussed with the Japanese Government its program of control over exports of textiles. However, this program is regarded as an exceptional one and not as establishing a precedent for similar action in other cases, including the tuna industry.

"The interest of the tuna industry in government-to-government discussions of Japanese price and volume controls affords an opportunity to make clear the policy of the Administration with respect to the question of intergovernmental agreements for the voluntary control of exports to the United States. As you know it is the policy of the United States Government to encourage free competitive enterprise, both domestically and internationally. Negotiated voluntary controls are in basic conflict with that policy. It has been the experience of our Government that negotiation of "voluntary" controls over exports does not result in satisfaction to the industries seeking the controls, or those industries dependent upon access to imported materials, or domestic consumers, or the foreign governments involved.

"The plan of action submitted by the Southern California tuna industry is regarded as a helpful attempt to move forward, in cooperation with appropriate government agencies, in a constructive program for the improvement of the situation in the tuna industry. The plan of action stated the belief of the industry that a conference would be eminently worthwhile irrespective of the range of subjects that the Administration might feel should be recommended to the Japanese Government for discussion at this time. On that basis, the United States Government proposed to the Japanese Government that informal discussions be held as indicated in the third paragraph in this letter, with the specific understanding that the discussions will not deal in any way with future price or volume controls.

"The Japanese Government has now agreed in principle to an intergovernmental meeting, and it is anticipated that they will be able to give their formal agreement as soon as the agenda has been mutually approved. The Government is prepared to invite a limited number of representatives of the tuna industry to attend the meeting as members of the United States Delegation.

"If you agree that government-to-government discussions on the basis indicated in this letter would be beneficial to the tuna industry, it would be appreciated if you would so indicate in your acknowledgment of this letter. Copies of this letter are being sent to all participants in the July 8 meeting and their views are likewise being requested.

"In conclusion, it should be understood, of course, that none of the actions discussed in this letter affect in any way the applicability of the antitrust laws of the United States and the Order of the Federal Trade Commission in Docket No. 6623, July 24, 1957, so far as they may be relevant.

"Sincerely yours,

"Ross Leffler
Assistant Secretary of Interior
for Fish and Wildlife

"W.T.M. Beale
Deputy Assistant Secretary
of State
for Economic Affairs

"Bradley Fisk
Deputy Assistant Secretary of Commerce
for International Affairs"

* * * * *

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1959 at the 12½-percent rate of duty is 52,372,574 pounds. Any imports in excess of the quota will be dutiable at 25 percent ad valorem.

Imports from January 1-August 29, 1959, amounted to 31,345,084 pounds, according to data compiled by the Bureau of Customs, January 1-August 30, 1958, a total of 31,034,647 pounds had been imported. The quota for 1958 of 44,693,874 pounds was reached on November 20, 1958.

United States Fishing Fleet 1/ Additions

JULY 1959:

A total of 60 vessels of 5 net tons and over were issued first documents as fishing craft during July 1959--a decrease

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft by Areas, July 1959

Area	July		Jan.-July		Total
	1959	1958	1959	1958	1958
	(Number)				
New England	2	-	10	10	13
Middle Atlantic	1	2	6	9	13
Chesapeake	11	11	56	55	99
South Atlantic	15	15	59	76	135
Gulf	12	29	88	178	270
Pacific	11	18	70	84	112
Great Lakes	-	2	5	5	10
Alaska	8	1	28	24	31
Virgin Islands	-	-	-	1	1
Total	60	78	322	442	684

Note: Vessels have been assigned to the various areas on the basis of their home ports.

1/ Includes both commercial and sport fishing craft.

of 18 vessels compared with the same month last year. The South Atlantic area led with 15 vessels, while the Gulf area was second with 12 vessels, followed by the Chesapeake and Pacific areas with 11 vessels each.

Table 2 - U. S Vessels Issued First Documents as Fishing Craft by Tonnage, July 1959

Net Tons	Number
5 to 9	27
10 to 19	16
20 to 29	9
30 to 39	44
40 to 49	1
50 to 59	3
Total	60

During the first seven months of 1959, a total of 322 vessels were issued first documents as fishing craft--120 below the same period of 1958. Most of the decline occurred in the Gulf area where 90 fewer vessels were documented in 1959 than in 1958.

U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, JULY 1959:

Imports of edible fresh, frozen, and processed fish and shellfish into the United States during July 1959 increased 16.7 percent in quantity, but dropped 0.7 percent in value as compared with June 1959. The increase was due primarily to higher imports of groundfish fillets (up 10.8 million pounds) and frozen albacore and other tuna (up 3.4 million pounds), and to a lesser degree, an increase in the imports of canned tuna in brine. The increase was partly offset by a 1.9-million-pound-decrease in the imports of lobster and spiny lobster.

U. S. Imports of Edible Fishery Products, July 1959 with Comparisons

Item	Quantity			Value		
	July		Year	July		Year
	1959	1958	1958	1959	1958	1958
	(Millions of Lbs.)			(Millions of $)		
Imports:						
Fish & shellfish:						
Fresh, frozen, & processed1/	93.4	100.7	956.8	27.0	28.3	278.4
Exports:						
Fish & shellfish:						
Processed only1/ (excluding fresh & frozen)	6.2	1.9	41.2	1.4	1.0	15.6

1/Includes pastes, sauces, clam chowder and juice, and other specialties.

Compared with July 1958, imports in July this year were lower by 7.3 percent in quantity and 4.6 percent in value due to lower imports of frozen albacore tuna (down 7.1 million pounds), groundfish fillets (down 3.3 million pounds), and canned sardines not in oil (down 3.2 million pounds). Compensating for the decline was an increase of about 6.0 million pounds in the imports of frozen tuna other than albacore and frozen shrimp (up 1.6 million pounds).

United States exports of processed (mostly canned fish and exclusive of fresh and frozen) fish and shellfish in July 1959 were up by 37.8 percent in quantity and 7.7 percent in value as compared with June 1959. Compared with the same month in 1958, the exports this July were higher by 226.3 percent in quantity and only 40.0 percent in value. The higher exports in July this year were due to increased exports of canned California sardines, salmon, and squid. Those products accounted for about 90 percent of total exports of processed fish and shellfish in July this year.

* * * * *

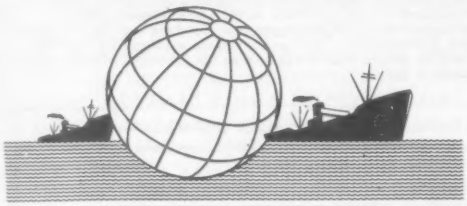
EXPORT TRADE PROMOTION SERVICE INITIATED BY COMMERCE DEPARTMENT:

The inauguration of a new trade promotion service as part of a program to increase United States export sales was announced by the Assistant Secretary of Commerce for International Affairs.

To put prospective buyers in speedy touch with their local sources of supply for United States products, the Commerce Department's Bureau of Foreign Commerce is asking United States manufacturers and exporters to fill out a 3 x 5 card identifying each of their agents and licensees in foreign countries. These cards will be transmitted by that Bureau to U. S. Foreign Service Posts to be used as part of an "Agency Index" for ready reference when United States commercial officers are asked the important question: "Where can I buy a specified United States product?"

United States Foreign Service Officers handling commercial matters abroad

frequently are asked, both by businessmen and foreign government representatives, how purchase of United States products can be made. Although overseas representatives of many firms are well known to U. S. Foreign Service Posts, complete listings usually are not available. By having at their fingertips the names and addresses of agents or licensees, commercial officers serving the interests of United States firms abroad will be able to place before potential customers information on all local



sources of supply. If a buyer is interested in a trademarked product or replacement equipment, the name of the representative on the scene can be supplied readily.

The 3 x 5 cards (Form FC-30) may be obtained from any of the Commerce Department's 33 field offices or from the Commercial Intelligence Division, Bureau of Foreign Commerce, U. S. Department of Commerce, Washington 25, D. C. The data furnished by United States firms will not be published.

The Assistant Secretary of Commerce said that vigorous competition in foreign trade today demands greater cooperative action between Government and private business, and the new Agency Index service is one means by which the Government can better serve the needs of private business, particularly small business.

All firms having representatives or licensees abroad should take advantage of the Agency Index service.

* * * * *

GROUNDFISH FILLET IMPORTS, AUGUST 1959:

Imports of groundfish (including ocean perch) fillets and blocks into the United States in August 1959 amounted to 15.1 million pounds--a gain of 421,000 pounds or 3 percent as compared with August 1958. Canada continued to lead all other countries in these imports with 9.9 million pounds--a decline of 180,000 pounds as compared with the corresponding month of last year. Iceland was second with 2.3 million pounds--1.4 million pounds below August 1958. Denmark followed with 1.6 million pounds--a gain of 1.1 million pounds over the same month last year. The remaining 1.3 million pounds were imports from Norway, West Germany, Greenland, the United Kingdom, Miquelon and St. Pierre, and the Netherlands.

During the first eight months of 1959, total imports of groundfish and ocean perch fillets and blocks into the United States amounted to 119.9 million pounds. Compared with the same period of 1958, this was a gain of 14.9 million pounds or 14 percent. Canada (58.2 million pounds) accounted for 49 percent of the 1959 eight-months total. Imports from Iceland--32.8 million pounds--made up 27 percent of the total, while Denmark was next with 13.6 million pounds or 11 percent, followed by Norway with 10.0 million pounds or 8 percent. Seven other countries accounted for the remaining 5.3 million pounds or 5 percent.

Note: See Chart 7 in this issue.

Wholesale Prices, September 1959

Due primarily to higher wholesale prices for large drawn haddock, fresh shrimp, and canned pink salmon, the September 1959 wholesale price index for edible fishery products (fresh, frozen, and canned) rose about 1.7 percent from the preceding month, but was lower by 6.4 percent as compared with September a year ago.

Shorter supplies of large haddock at Boston and light receipts of Lake Superior drawn whitefish at Chicago were responsible for the increase of 5.1 percent in the index for the drawn, dressed, and whole finfish subgroup from August to September this year. The sharp rise (40.3 percent) in the ex-vessel price of large drawn fresh haddock and a 13.3 percent increase in the drawn whitefish price were partly offset by

some declines in the wholesale prices for frozen halibut, fresh round yellowpike, and round whitefish at New York. Compared with September a year ago, the subgroup index this September was up slightly (1.1 percent). Lower wholesale prices for western halibut and whitefish at New York were more than offset by higher prices for the balance of the items in this subgroup.

Fresh processed shellfish prices in mid-September 1959 were higher by 3.3 percent than the previous month. Fresh headless shrimp prices were higher by 4.0 percent and shucked oysters up by 4.2 percent. On the other hand, fresh small haddock fillet prices declined 6.8 percent from August to September this year. The fresh processed fish and shellfish subgroup index this September dropped by 12.7 percent from the same month of 1958 because of sharply lower wholesale prices for haddock fillets at Boston (down 25.8 percent) and fresh headless shrimp (down 24.0 percent) at New York City. However, due to scarce supplies of oysters, prices were up about 4.2 percent from September 1958 to September this year.

The continuing weakness in the market for frozen shrimp was responsible for the decline of 4.5 percent in the September 1959 index for the processed frozen fish and shellfish subgroup as compared with the preceding month. Frozen shrimp prices at Chicago declined about 5 cents a pound or 8 percent during this period. In addition, a drop of 1.4 percent occurred in frozen flounder fillet prices from August to September this year. From September 1958 to September this year all subgroup items were priced lower and resulted in a 20.4 percent decrease in the subgroup index. In September this year frozen haddock fillets were lower by 17.7 percent, frozen flounder fillets down by 9.8 percent, ocean perch lower by 6.8 percent, and frozen shrimp down 26.6 percent.

Canned fish prices rose again (1.4 percent) in September this year from the preceding month. By mid-September 1959 earlier predictions of a very small canned salmon pack were realized and prices jumped about 3.1 percent at Seattle. Other canned fish prices this September were unchanged from the preceding month. Compared with September of last year, prices this September were up 1.5 percent due to higher canned salmon prices (up 16.6 percent) and canned Maine sardine prices (up 6.4 percent). These increases from September 1958 to this September offset a decline of 9.6 percent in canned tuna and a 28.8 percent in canned California sardine prices. The dispute between the sardine fishermen and canners over ex-vessel prices was settled on October 3, but prospects of the California sardine fleet attaining the predicted catch of 100,000 short tons appeared remote as of the end of September. The pack of Maine sardines for the 1959 packing season will be lower than the less than average pack made in 1958.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, September 1959 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1947-49=100)			
			Sept. 1959	Aug. 1959	Sept. 1959	Aug. 1959	July 1959	Sept. 1958
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					121.8	119.8	123.0	130.1
Fresh & Frozen Fishery Products:					135.2	132.8	139.0	150.0
Drawn, Dressed, or Whole Finfish:					159.9	152.2	160.2	158.1
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.15	.11	153.1	109.1	169.5	151.9
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.33	.35	101.1	107.8	103.6	113.2
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.80	.80	179.7	179.7	171.3	174.2
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.73	.64	179.7	158.6	151.2	161.1
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.73	.80	146.7	161.8	159.8	200.2
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.73	.83	170.0	193.5	190.0	140.7
Processed, Fresh (Fish & Shellfish):					125.5	121.5	123.0	143.8
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.35	.37	117.4	125.9	139.5	158.2
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.67	.64	105.1	101.1	104.3	138.2
Oysters, shucked, standards	Norfolk	gal.	6.25	6.00	154.7	148.5	145.4	148.5
Processed, Frozen (Fish & Shellfish):					107.2	112.3	120.9	134.7
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.37	.38	96.8	98.2	102.1	107.3
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.33	.33	102.0	102.0	105.2	124.0
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.27	.27	108.8	108.8	112.8	116.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.64	.69	98.0	106.5	118.4	133.5
Canned Fishery Products:					103.4	102.0	100.5	101.9
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	24.50	23.75	127.8	123.9	122.6	109.6
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	10.80	10.80	77.9	77.9	77.9	86.2
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.50	7.50	88.1	88.1	85.1	123.7
Sardines, Maine, keyless oil, No. 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.75	8.75	93.1	93.1	87.8	87.5

1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

International

CUBA-UNITED STATES CONVENTION FOR CONSERVATION OF SHRIMP:

The United States and Cuba on September 4, 1959, exchanged instruments of ratification bringing into force the Convention for the conservation of shrimp which had been signed by representatives of the two countries on August 15, 1958. The United States President, acting upon the advice and consent of the Senate, ratified the Convention on the part of the United States on June 12, 1959.

The Convention has for its purpose scientific research and the adoption of conservation measures affecting shrimp harvested by fishermen of the two countries in the Gulf of Mexico off the coasts of Cuba and Florida. The region involved has been one of the important shrimp areas of the Gulf. During the past few years the percentage of small shrimp from these grounds has been increasing, suggesting the possibility that a substantial part of the yield is being taken before the shrimp have reached the larger, more commercially desirable sizes. Under the terms of the Convention the United States and Cuba will conduct studies to learn the facts and take necessary action to maintain this resource at the most productive level for the benefit of both countries.

This is the ninth international agreement by means of which the United States is now cooperating with neighboring countries in the conservation of fishery resources. All but one of these agreements, the Great Lakes Fishery Convention with Canada, affect high-seas fisheries. One, the Whaling Convention (15 nations), is worldwide in scope. The others encircle our country, starting with the Northwest Atlantic (12 nations), crossing the Continent to the fur seals of the North Pacific (4 nations), the halibut of the North Pacific, and the salmon of the Fraser River in British Columbia (United States and Canada). A tripartite agreement between the United States, Canada, and Japan covers all fishery resources of common concern to these three nations in the North Pacific. The Tuna Convention with Costa Rica and Panama deals with the tunas of the eastern tropical Pacific.

The United States has now joined with Cuba in another of these international undertakings between friendly nations for the preservation of fishery resources of common concern, to the benefit of both.

FISH MEAL CONFERENCE HELD IN SPAIN

Fish meal is increasingly recognized throughout the world as the most valuable protein ingredient produced in substantial quantity and used as a supplement in animal feeds. Production throughout the world has very substantially increased in recent years, particularly from the new producing countries of South Africa, Portugese Angola, Chile, and Peru. Demand exceeds supply so that the world's producers are continually trying by new techniques to produce every extra ton possible. Raw material on which the industry depends is both whole fish and the fish-processing waste.

Fish meal is principally used as a growth food for young animals. The great increase in the broiler industry owes much of its success to the use of fish meal. Most of the European manufacturing countries, other than Norway and Denmark, use all their home-produced meal in their own countries and import large quantities. Britain is the largest user of fish meal in Europe, while the United States is the largest user in the world.

Some years ago, the President of the French Fish Meal Manufacturers' Association suggested that in view of the growing importance of this industry, the rapid development of new techniques, and the greatly increased demand, it would be good to have a conference so that manufacturers could discuss their problems: subsequently a conference attended by the manufacturers from most European countries was held in Paris in 1952 and was the first of a series of very successful conferences.

Since the first conference, the British Association of Fish Meal Manufacturers has organized each conference and has been the host at two of them--1955 and 1956. Norway was the host the following year and last year's conference was held in Cape Town with South Africa as the host.

The scope of the conference is now widened to include not only European manufacturers, but producers overseas and those countries who have been represented at the

International (Contd.):

conferences include Angola, Belgium, Canada, Denmark, Germany, Great Britain, Holland, Iceland, Morocco, Norway, Portugal, Spain, Sweden, and the United States. In October of 1959, the conference was held in Madrid at the invitation of the Spanish manufacturers.

At the request of the Spanish manufacturers, the British Association of Fish Meal Manufacturers made the arrangements for the Madrid conference and the large and interesting agenda showed that scientific and technical matters occupied a large part of the discussions.

The series of conferences has produced a high degree of cooperation amongst the countries concerned who discuss their problems in a friendly informal atmosphere. This has already led to considerable interchange of information. The next step in the evolution of this industry may be to produce a human food.

Already fish meal or fish flour is being used in some countries where the standard of human nutrition is low and the high biological quality of this food is proving its worth in improving the diet of the people of those countries.

EUROPEAN COMMON MARKET

FISHERY ASSOCIATIONS FORMED:

A large number of associations have already been formed within the framework of the European Economic Community. The gradual harmonization over a period of years of the economic and social policies of the Six will affect commerce and industry in each country, and the primary purpose of these groupings is to study the implications of these changes and make preparations to meet them. The activities of the associations range from round-table discussions held from time to time to the establishment of a formal set-up with a permanent secretariat. Among the many associations formed representing every type of industry or business are the following on or of interest to fisheries:

Animal Feeds:
Fédération Européene des Fabricants d'Aliments Composés pour Animaux
27 rue des Paroissiens
Brussels, Belgium

Edible Oils:
Association des Huileries du Marché Commun
121 rue Royale
Brussels, Belgium.

Fish:
Association des Industries du Poisson de la CEE
55 rue de la Loi
Brussels, Belgium.

Quite a number of associations on food distribution were also formed.

MARINE OILS

WORLD PRODUCTION AND EXPORTS OF MARINE OILS EXPECTED TO DROP IN 1959:

World production and exports of marine-animal oils (whale, sperm whale, fish-body, and fish-liver oils) will be less in 1959 than in 1958. (See table.)

Exports of marine oils in 1959 probably will fall short of last year's volume chiefly because of smaller production of whale and sperm oil. The 1958/59 Antarctic season was less successful than the previous season. Although more whales were killed, the yield of oil per unit was down sharply. Fish oil exports may approximate 1958 tonnage. European exports may decline mainly because Norway's spring herring catch was far below average although above the exceptionally low output in 1958. This decline may be offset by the increase in United States exports which now appears likely.

Estimated World Production and Exports of Marine-Animal Oils, Forecast 1959, Annual 1952-58, 1/ and Averages 1935-39 and 1950-54

Commodity	Forecast 1959	1958 2/	1957	1956	1955	1954	1953	1952	Average 1950-54	Average 1935-39
	(1,000 Short Tons)									
Production:										
Whale	415	435	430	425	420	455	420	460	440	545
Sperm whale	115	125	110	120	100	75	55	85	80	30
Fish (including liver)	490	470	485	565	540	520	460	460	470	480
Total	1,020	1,030	1,025	1,110	1,060	1,050	935	1,005	990	1,055
Exports:										
Whale	415	435	430	425	420	455	420	460	439	545
Sperm whale	115	125	110	120	100	75	55	85	78	30
Fish (including liver)	200	200	190	200	205	215	195	134	177	135
Total	730	760	730	745	725	745	670	679	694	710

1/Beginning with 1950 the years indicated are those in which the predominant share of a given oil was produced.
2/Preliminary.
Note: Compiled from official and other sources. Revised from previous data issued.

International (Contd.):

TRADE AGREEMENTS

ANGOLO-SOVIET AGREEMENT INCLUDES FISHERY PRODUCTS:

The five-year Anglo-Soviet Trade Agreement, signed on May 24, 1959, contains a provision for an increase each way in the exchange of consumer goods for the first year of the agreement. New quotas have now been established following negotiations between the Board of Trade and the Soviet trade delegation in London and made public August 28, 1959. The quotas are, of course, only targets, and their fulfillment depends upon the demand for the items in the two countries, and, to a lesser extent perhaps, upon the ability or desire to supply the items.

In the quotas for United Kingdom goods to be exported to the Soviet Union are included herring valued at Ł250,000 (US$702,500) f.o.b. and white fish valued at Ł550,000 ($1,545,500) f.o.b.

Quotas for Soviet goods to be exported to the United Kingdom include canned crabmeat valued at Ł1,000,000 ($2,810,000) f.o.b., canned salmon valued at Ł500,000 ($1,405,000) f.o.b., and caviar (including red caviar) valued at Ł85,000 ($238,900) f.o.b. In addition licenses for Ł550,000 ($1,545,500) c.i.f. of Soviet canned salmon will be issued by the United Kingdom under arrangements which have been made outside the consumer goods agreement. (United States Embassy, London, report of September 3, 1959.)

WHALING

JAPANESE WITHDRAW PROPOSAL TO REDUCE NUMBER OF CATCHER BOATS:

Japan's whaling industry has withdrawn its proposal that each Antarctic whaling fleet should reduce the number of catcher boats for next season, according to an industry spokesman in Tokyo. He gave the main reason for this as the rejection by the Norwegian whaling industry of the proposal and Norway setting itself a limit of 5,800 blue-whales units. British whaling firms had supported the proposal.

The spokesman added that the Japanese whaling industry was discussing its voluntary limit for next Antarctic season. The withdrawal of Japan's proposal should not be taken as indicating that Japan intends to increase the number of her catchers.

NEW RUSSIAN WHALING FLEET:

A new Russian whaling fleet will be operating in the Antarctic next whaling season, according to Russian press reports. These claim that the expedition's factoryship has "probably no equal" among foreign whaling vessels.

The Russians say the ship is equipped to make full use of byproducts, with several mechanized lines for processing raw materials, also a research Laboratory.

Argentina

FISHING INDUSTRY CONTINUES MODERNIZATION PROGRAM:

A Buenos Aires, Argentine, fishing company has announced a 100-million-peso (about US$1,171,000 at rate of 85.35 pesos to US$1) expansion and modernization program. The company has chartered the modern 695-ton Japanese trawler-freezership, Yoshino Maru. This vessel, with a Japanese crew of 50, was due in Mar del Plata in September. The vessel is expected to fish tuna and swordfish in the Atlantic about 200 miles offshore.

The catches will be processed and frozen aboard the Japanese vessel, and after landing will be distributed by refrigerated trucks from the company's plant in Mar del Plata. Eventually the company hopes to produce fish for export. (Canada Foreign Trade, September 12, 1959.)

* * * * *

SHRIMP INDUSTRY TRENDS:

Argentina's landings of shrimp have shown no unusaual changes during the past few years. Landings of 1,535 metric tons jumped to 2,471 tons in 1956, but

Argentina (Contd.):

then in 1957 dropped back to 1,575 tons. For the first 11 months of 1958 only 1,096 tons were landed. However, since the height of the Argentine season occurs towards the end of the calendar year, it is assumed that when December data become available the landings for 1958 will be about the same as in 1957.

Although there has been no drastic change in the landings, exports show another picture. Exports of fresh and frozen shellfish (believed to be mostly shrimp) have risen manyfold since 1955. From a low of 2.8 metric tons in 1955, exports jumped to 45.6 tons in 1956 and 244.8 tons in 1957. In 1958 exports of 423.1 tons were almost double the amount exported in 1957. For the first three months of 1959 exports amounted to 89.3 tons.

When looking at the exports to the United States, it becomes evident that more and more Argentine exporters are concentrating on shipping shrimp to the United States. There were no exports of shrimp to the United States in 1955, but in 1956 a total of 10.2 tons were shipped. In 1957 exports to the United States rose to 145.2 tons and spurted to 414.5 tons in 1958. During the first three months of 1959, 89.3 tons were exported to the United States--100 percent of Argentine's exports of fresh and frozen shellfish.

Australia

FISHERIES CONSERVATION EXTENDED TO EXTRATERRITORIAL WATERS:

The Australian Government has taken action to protect spiny lobster (crayfish), an important dollar-earning export, and shark in extraterritorial waters. These are already protected in territorial waters by State legislation. The essential purpose of the new regulations is to conserve existing stocks. The regulations apply to Australian nationals only; no other nationals at present take spiny lobster or shark off Australia. The new regulations took effect from August 1, 1959.

Spiny Lobster: Australia exports about US$5 million worth of spiny lobster tails to the United States annually and Commonwealth Fisheries officials hope that the conservation measures undertaken will keep the catch stable. There is no hope of an increase in supplies from presently-known grounds, although a survey of the islands western of the Great Australian Bight may reveal new crayfish grounds.

The Commonwealth Government, under legislation passed in 1959, is able to provide in extraterritorial waters the same protection for female spiny lobster already provided by State legislation in territorial waters. A closed season for female spiny lobster has been established and the taking of berried ones has been prohibited.

School Shark: Australia's third most important fish (in terms of quantity caught) is shark, and is principally sold by "fish and chips" shops. The school shark is a particularly important source of fish for the Victoria market.

The latest proclamations by the Minister for Primary Industry have established a legal minimum length of 36 inches and a closed season during November in extraterritorial waters.

The news release announcing the conservation measures in extraterritorial waters pointed out that the Commonwealth Gazette of July 23, 1959, contains a number of notices issued under the Commonwealth Fisheries Act designed to protect school shark and crayfish stocks in extraterritorial waters.

One of the notices prohibits the taking in all proclaimed waters of female spiny lobster of any species having eggs or spawn attached, which means that the protection given to berried spiny lobster by the various States in territorial waters has now been extended to extraterritorial waters.

The other notice dealing with female spiny lobster provides for a closed season for females of the species Jasus lalandii from August 1 to November 30 in proclaimed waters off Victoria and Tasmania. This closed season would be extended next year to cover the period June 1 to November 30 to coincide with the closed season in Victorian and Tasmanian territorial waters.

Because of changes in the wording of the Act it was necessary to publish new notices covering: (1) a legal minimum length of 36 inches for school shark; (2) a closed season during November for school shark both in extraterritorial waters off New South Wales, Victoria, South Australia, and Tasmania; (3) a legal minimum length of $2\frac{1}{2}$ inches on the carapace for the spiny lobster Panulirus longipes in extraterritorial waters off Western Australia; (4) a closed season from September 1 to November 14 for the spiny lobster Panulirus longipes in extraterritorial waters in Western Australia between 30° S. latitude and 33° S. latitude.

These four notices continued the regulations at present in force without any alteration.

A notice has been included to provide a separate closed season from December 15 to January 31 for southern spiny lobster in the King Island area and the notice providing for a closed season in the whole Victorian Tasmanian area from September 1 to October 15 has been amended accordingly.

Australia (Contd.):

The notice covering a legal minimum of 4¼ inches on the carapace for southern spiny lobster in extraterritorial waters off Victoria and Tasmania has also been amended at the request of the Tasmanian Government to include prohibition of the cutting up or dismembering of spiny lobster on a boat.

The tenth notice, setting a closed season for the spiny lobster Panulirus longipes from August 16 to March 14 in the Abrolhos area, provides for a slight extension of the area to include the Turtle Dove Shoals.

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LONG-LINE FOR DEEP-WATER SPECIES DEVELOPED:

The Australian Commonwealth Scientific and Industrial Research Organization (CSIRO) has announced the perfection of a new method of catching deep-water "trevally" (genus Caranx), a fish which weighs 15-40 pounds. Trevally are caught off the continental shelf at depths of more than 100 fathoms. After years of experimentation, CSIRO had perfected a method which involves attaching 25 hooks, spaced a fathom apart and baited with tuna or barracuda, along a line weighted down with a 70-pound weight, according to a September 4, 1959, dispatch from the United States Embassy in Canberra.

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SHRIMP LANDINGS AND EXPORTS:

Landings: Australia's landings of shrimp have shown a steady decline since fiscal year 1954/55 from 6,648,000 pounds to 4,687,000 pounds in fiscal year 1957/58. Most of the shrimp is landed in the states of New South Wales and Queensland.

Table 1 - Australia's Shrimp Landings by States, Fiscal Years 1953/54-1957/58

Fiscal Year	New South Wales	Victoria	Queensland	Western Australia	Total
	(1,000 Lbs.)				
1957/58	1,520	20	3,000	147	4,687
1956/57	2,386	-	2,500	189	5,075
1955/56	3,672	1	2,400	75	6,148
1954/55	4,603	19	2,000	26	6,648
1953/54	3,558	-	700	45	4,303

Exports: Only a small percentage of the landings are exported, and the bulk of the exports are shipped to the United States. Most of the exports consist of frozen raw headless shrimp.

Table 2 - Australian Total Exports and Exports to the United States of Fresh and Frozen Shrimp, 1956/57 and 1957/58 1/

Destination	Raw		Cooked	Total
	Heads-on	Heads-off		
	(Pounds)			
1957/58:				
United States	-	170,050	143	170,193
Honolulu	2,050	94,300	-	96,350
Other	300	7,050	25,629	32,979
Total	2,350	271,400	25,772	299,522
1956/57:				
United States	-	128,885	-	128,885
Honolulu	-	83,265	20,190	103,455
Other	4,193	7,665	73,179	85,037
Total	4,193	219,815	93,369	317,377

1/Excludes re-exports.

Table 3 - Australian Exports of Fresh and Frozen Shrimp by States of Origin, 1956/57 and 1957/58 1/

Fiscal Year and Type	New South Wales	Queensland	Tasmania	Total
	(Pounds)			
1957/58:				
Raw, heads-on	100	2,250	-	2,350
Raw, heads-off	5,100	266,300	-	271,400
Cooked	10,229	15,543	-	25,772
Total	15,429	284,093	-	299,522
1956/57:				
Raw, heads-on	2,747	1,446	-	4,193
Raw, heads-off	21,545	198,270	-	219,815
Cooked	27,154	66,215	-	93,369
Total	51,446	265,931	-	317,377

Note: Fiscal Year--July 1-June 30.

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TUNA LANDINGS BREAK RECORD:

Tuna fishing is booming in New South Wales and is on the upgrade in South Australia, the Australian Minister for Primary Industry announced on April 26, 1959. He was commenting on this season's (1958/59) record catch reported in the two states in which Australia's main tuna fisheries are based.

Landings of tuna at New South Wales and South Australia ports this season to April 22 totaled 2,369 metric tons--a new record. They were 68.5 percent above the two-State catch of 1,406 tons in 1957/58.

The New South Wales season closed about the end of February when the canneries at Eden and Narooma had received a combined total of 1,797 tons, double the previous season's total. The New South

Australia (Contd.):

Wales tuna landings were worth at least £80,000 (US$180,000) ex-vessel.

In South Australia, the season's landings were 572 tons, or about 30 tons above 1958. There was still a possibility of additional landings in South Australia.

The present commercial-scale Australian tuna fisheries have expanded 25-fold in seven years, from a catch of 95 tons in 1951/52 to nearly 2,370 tons already this season.

Most of the tuna caught by Australian fishermen is used for canning and in recent years this fishery has become a useful earner of foreign exchange through exports of canned tuna to the United Kingdom and the United States.

Boliva

IMPORTS OF FISHERY PRODUCTS, 1958:

During 1958 Bolivia imported about 1.6 million pounds (valued at US$269,402) of fishery products, of which, 82.3 percent consisted of canned sardines in tomato sauce. The only other important fishery product imported in 1958 was about 200,000 pounds of preserved or canned fish.

Boliva's Imports of Fishery Products, 1958

Product	Kilos	Pounds	Value US$
Caviar and fish roe. . . .	54	119	51
Anchovies (all types) . . .	2,186	4,818	1,754
Dried fish	23,582	51,989	16,487
Preserved fish	90,649	199,845	49,031
Fresh and cured fish . . .	21,637	47,700	3,784
Canned sardines (tomato)	603,596	1,330,687	198,118
Fish paste	864	1,904	177
Total	742,568	1,637,092	269,402

British West Indies

GRENADA TUNA LANDINGS:

Grenada (one of the Windward Islands), British West Indies, fishermen catch from 50,000 to 70,000 pounds of tuna a year, mostly bluefin and yellowfin. The fish range from 100 to 150 pounds each.

Experiments with miniature long lines (20 hooks) are now being carried out and it is believed that landings of tuna could be quadrupled if the long-lining experiments are successful and if a ready market for the tuna can be developed. (West Indies Fisheries Bulletin, May/June 1959.)

Canada

HERRING OIL SHIPPED IN TANKER:

When the small Norwegian deep-sea tanker Nordgard slipped into her berth at Vancouver's LaPointe Pier late in March 1959 it marked the first time in the history of the British Columbia fishing industry that a tanker had been chartered to load herring oil. Up until now, herring oil was shipped overseas in the deep tanks of cargo freighters.

After the Nordgard had her tanks, pipes, and pumps surveyed to ensure they were in spotless condition, the 3,800 long tons of herring oil, the equivalent of 140 railway tank cars and worth over C$500,000, was loaded by two different methods. Approximately 1,800 long tons were pumped at full capacity of 60 tons per hour from the dockside storage tanks into the tanker. The remaining 2,000 long tons were transported from tank storage facilities at Steveston, B. C., some 25 miles, by a small coastal tanker then pumped aboard the Nordgard. The oil was consigned to Manchester, England, for use in the processing of margarine and cooking oils. (Trade News, April 1959.)

* * * * *

PLANS FOR NEW OCEANOGRAPHIC INSTITUTE ANNOUNCED:

A member of the Canadian Parliment from Nova Scotia in a statement published in a Halifax newspaper on August 4, 1959, outlined plans for a greatly expanded program of oceanographic research. His statement follows:

"Canada, which possesses the longest coastline of any country in the world, is

Canada (Contd.):

taking steps to expand oceanograpy in the Department of Mines and Technical Surveys to fill the gaping need for oceanographic data on its coastal waters for defense and research assessment purposes.

"It is setting up on the east coast, in Bedford Basin near Halifax, a C$3 million oceanographic institute, which will have the facilities to allow studies in any phase of the science. The new institute will take five years to complete and, when in operation, will have a staff of some 300 oceanographers, hydrographers, submarine geologists and other scientific personnel, plus supporting staff, and an operating fleet of oceanographic vessels.

"A multi-million dollar ship-building program has already been set under way to provide the fleet of oceanographic vessels. The first of these vessels, the $7 million C.G.S. Hudson, is expected to be commissioned in 1961.

"The establishment of the institute which is to be known as the Bedford Institute of Oceanography, is announced today, on the eve of Dartmouth Natal Day.

"Specifically, the new institute will turn an oceanographic spotlight on Canada's Atlantic and sub-Arctic coasts to study the physical characteristics of the waters and underlying seabed. The resultant data is needed for anti-submarine defenses to ascertain the resources potential of the country's continental shelf in these regions and to assist navigation.

"It will also permit the overdue expansion of the Atlantic and sub-Arctic sections of the Canadian Hydrographic Service. These sections will be moved from Ottawa to Bedford Basin, which will greatly facilitate hydrographic operations in eastern and northern areas. In addition, it will house the regional office of the Geological Survey of Canada.

"The whole project will mean the building up, near Dartmouth, of a strong centre of marine science. It includes liaison with the Fisheries Research Board, the Atlantic Oceanographic Group, which will be housed in the new institute, and with Dalhousie University which is setting up--with the help of a National Research Council grant--an Institute of Oceanography for the training of scientists, many of who will be employed by the new Federal Institute. It will also be the headquarters of the polar group of oceanographers, hydrographers, geologists and other scientists, working in the icebound sections of the far Arctic. They will carry out a broad program of oceanographic research on the rim of the Arctic Basin.

"Canada posseses little knowledge of the oceans which surround it. Except for a specialized program in oceanography by the Fisheries Research Board over the years, oceanography in Canada has been a neglected science, mainly because of the size of the job to be done and the great expense entailed in doing it.

"Today, however, the knowledge derived from oceanographic research is vitally needed by government and industry for purposes of defense, commerce and science. In the face of the growing danger of ballistic missile-carrying submarines, a detailed knowledge of the characteristics of the water and of the sea bed is necessary for the development and operation of adequate instruments of detection.

"Knowledge gained from oceanography is required, too, to ascertain the resource potential of the country's continental shelves. This is especially important today because of the conclusions arrived at by the Geneva Convention of 1958 that the resources of the continental shelves belong to the adjacent nation. On the east coast, Canada's continental shelf extends 100 to 200 miles out into the Atlantic Ocean.

"An extensive program of work is envisaged in the new project. Oceanographers and hydrographers will study and map the topography of the ocean floor and measure the movements, temperature, density and chemical properties of the water at various depths.

"They will study the separate and distinct layers of water of which the oceans are comprised, and each of which has its own characteristics. Modern methods of submarine detection depend on the transmission of sound in water,

Canada (Contd.):

which requires a detailed knowledge of these characteristics.

"Geologists will study bottom sediments and cores taken from the ocean floor. Such studies will yield valuable data on the life of the earth's crust, changes in climate, vegetation, volcanic activity, etc; enable geologists to recreate the history of mountainous formations on land because, in the depths of the ocean, the temperature remains practically unchanged, there is no erosion and little movement of water; and reveal possible mineral resource wealth on the shelf.

"Geophysicists will use magnetometers, gravimeters, and seismic equipment to diagnose the structures underlying the floor.

"The new institute will be a combined laboratory and office building, with separate depots, shops and storage facilities. The scientific personnel will carry out investigations and research in modernly equipped laboratories. It will provide all needed store facilities for its fleet in the way of docking and berthing facilities, and routine repair and maintenance services. The institute is so planned, moreover, to permit the expansion of these facilities, if needed, to meet the requirements of a growing fleet.

"The heart of the new project will lie of course in its fleet of oceanographic and hydrographic ships. The shipbuilding program will add additional ships until the requirements are met for new ships and for the replacement of old and chartered ones now in use by the Canadian Hydrographic Service. The new C. G. S. Hudson and all new vessels will be combined oceanographic and hydrographic ships, equipped with laboratory and other facilities for survey and research work. They will be capable of working in any season of the year, while the larger ships, like the Hudson could work anywhere in the world. All vessels will be strengthened for work in the Arctic.

"The expansion in the charting activities of the department's Canadian Hydrographic Service is long overdue. Many factors, including defense needs, the entry of Newfoundland into Confederation, and resource development and exploratory and other activity in the Arctic, have greatly increased demand for charts and information on the coastline and waters involved.

"Since its establishment in 1883, the service has been operating on a scale far out of proportion to the size of the task to be done. Canada possesses some 120,000 miles of coastline. The greater part of this coastline, much of which is extremely complex and shoal-studded, has not yet been charted. The uncharted areas include almost all of the arctic archipelago, the northern mainland coast, Hudson Bay, and the Labrador coast.

"As a start on the expansion of its hydrographic activities, the department has added the chartered ship, M/V Theta, to its fleet. It is carrying out tidal, current, and oceanographic surveys in Cabot and Hudson Straits. Included in the fleet are the C.G.S. Baffin which is charting in Hudson Strait; the C.G.S. Kapuskasing which is sounding off the east coast of Newfoundland; the C.G.S. Cartier, engaged in charting work in the region of Cape Bald and Chaleur Bay in New Brunswick; and the C.G.S. Acadia which is doing similar work on the northeast coast of Prince Edward Island. By 1960 the service hopes to add . . . two additional ships for oceanographic work, and by 1962 the first ship under the new program, C.G.S. Hudson, will be added to the fleet.

"In setting up the Bedford Institute of Oceanography, Canada is taking cognizance of the importance of the fast-growing science of oceanography and of the value of the contribution it can make in the unravelling of the scientific mysteries of the country's last frontiers--its coastal waves."

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SURGE IN FISHING BOAT CONSTRUCTION:

In the Canadian Maritime Provinces this past spring boat builders reported the heaviest program of fishing boat construction in the postwar period.

Construction was in progress of scores of fishing craft ranging from draggers to small lobster fishing boats. So busy are

Canada (Contd.):

small lobster fishing boats. So busy are some of the yards that many fishermen have had to wait weeks before their orders could reach the cradle stage. While most of the larger craft--draggers, long-liners, and some of the larger Cape Island-type craft--are financed by fishermen's loan boards in the three Maritime Provinces, some of the smaller ones are financed by fishermen themselves.

This upswing in boat-building is general throughout the three provinces. New Brunswick reports the greatest fishing craft building boom in its history, while Prince Edward Island and Nova Scotia also report heavy activity along that line.

In the Caraquet-Shippegan area of northern New Brunswick, for instance, there are six 65-foot Gloucester-type draggers being built in addition to four long-liners and nearly 20 lobster boats in the 25-foot class. Two of the draggers will be operated in the Bay of Fundy area, while four will join the Shippegan fleet.

The Port Elgin district in eastern New Brunswick reports nearly 50 lobster boats building ranging in length from 40 to 44 feet. Two small draggers are being built at Black's Harbor, N. B.

Boat-building in Nova Scotia is keeping pace with its sister province. The major boat-building centers are reported working full tilt to keep up with orders. Two long-liners and several boats of the Cape Island class are being built at Lunenburg and there is also boat construction at Port Greville. At the latter place two draggers are being built for the Souris fleet in Prince Edward Island.

In the Yarmouth area two Cape Island-type boats have been built since the first of the year and two more are under construction. Reports from Wedgeport-Pubnico show that nine Cape Island boats are being built there in addition to one long-liner.

Until the current boat-building program is completed, final figures on the growth of the fishing fleets in 1959 will not be available. However, a glance at last year's figures shows an almost phenomenal growth in the postwar period. Last year the more than 26,000 fisherment reaped a sea harvest representing about C$35,000,000 in landed value.

Not counting the thousands of small boats engaged in the lobster fishery and other types of inshore fishing, there were more than 500 trawlers, draggers, long-liners, dory schooners, and swordfish boats operating out of Maritime ports in 1958.

Nova Scotia tops the list in all classes of boats. Last year that province had a dragger fleet of 163 vessels, while 99 draggers operated out of New Brunswick ports. Prince Edward Island had 13 draggers, all operating out of Souris. A dragger might be classified as a vessel of 100 feet or less in length which uses otter-trawl nets. There are, of course, vessels of the dragger-type fishing scallops and herring and using other types of gear.

The only large trawler fleet in the Maritimes operates out of the main ports in Nova Scotia. In 1958 it numbered 34 vessels, each ranging in length from 153 feet to 103 feet. Nova Scotia trawlers vary in tonnage from 399 to 132 tons.

The long-lining fleet in Nova Scotia included 85 vessels in the 26- to 50-ton bracket; 55 long-liners with tonnages from 51 to 150 tons and three vessels of that type over 150 tons.

Of the once-mighty fleet of schooners sailing out of Nova Scotia fishing ports to the fishing banks, in the North Atlantic, there are only 8 dory schooners left. Most of them sail out of Riverport.

There were 16 scallop draggers registered in Nova Scotia last year. Heaviest scallop landings last year were at Lunenburg. Bulk of the catch was taken from Georges Banks.

About 14 purse-seiners fish herring in the Bay of Fundy. Most of them are

Canada (Contd.):

of New Brunswick registry. In addition, there are 11 herring carriers which take the catches from the seiners at sea.

Nova Scotia has a fleet of swordfish boats. Yarmouth has become one of the major swordfish ports, and seven of the boats are owned there. During the swordfish season, which gets under way in June, a good portion of the long-liner fleet also engages in that type of fishing. (Trade News of the Canadian Department of Fisheries, April 1959.)

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TRANSFER OF DISEASE-RESISTANT OYSTERS ON EAST COAST IN FINAL PHASE:

"Operation Oyster" is in its final phase. This three-year project, sponsored by the Department of Fisheries of Canada, provided for the transfer of 10,000 barrels of disease-resistant Prince Edward Island oysters to rehabilitate stocks in New Brunswick and Nova Scotia.

The motor vessel Lamna, flagship of the Department's 30-boat patrol fleet in the Maritimes, conducted the transfer of the final 4,000 barrels to beds in the two mainland provinces. Assisting the Lamna were four other boats.

This final phase of the project called for the transplanting of oysters in specific areas in the Northumberland Strait extending from Pictou County in Nova Scotia to the Shippegan-Caraquet districts in northern New Brunswick.

A quantity is being held in reserve for seeding beds at Miscou in the same general area later if disease spreads to those waters. Results of the transplant program have been described as a singular success.

Depletion of the stocks in the two mainland provinces created a crisis in the once-profitable oyster industry. Production slumped drastically. In 1957 only 9,000 barrels were fished in the two provinces. In 1958 the production was less than half that amount. Normal production is around 30,000 barrels. Prince Edward Island's production in 1958 brought the fishermen C$263,000, an increase of $108,000 over the previous year. The devastation of mainland beds was similar to that which destroyed Prince Edward Island's beds in two epidemics from 1915-1920 and 1935-1940. Oysters which survived the heavy mortality are resistant to the disease (harmless to humans) and that is why they are being used to rehabilitate mainland stocks.

History of the present oyster crisis goes back to 1950. In that year heavy mortalities hit the oyster stocks in Kent County and later the mortalities spread throughout New Brunswick and into Nova Scotia. In 1952 there were nearly 8 million pounds of oysters harvested from Maritime oyster beds. Then for six years there was a sharp decline in New Brunswick and Nova Scotia until the production had been reduced by nearly two-thirds.

Early restoration of the commercial oyster fishery is promising if the oysters encounter favorable years for reproduction. With luck most fisheries should be producing again in 1965. (Canadian Trade News of June 1959.)

Note: Also see Commercial Fisheries Review, Dec. 1958, p. 65, Jan. 1958, p. 78.

Ceylon

U. S. S. R. BETTERS JAPANESE FISHERY AID PLAN TO CEYLON:

The realization of Japan's plan for economic aid in the development of Ceylonese fisheries is endangered by the Soviet Union's offering a similar plan on more advantageous conditions. The Japanese Government some time ago decided to give economic aid for the development of Ceylon's fishing industry through a $4 million deferred payment loan from the Export-Import Bank. Now it is reported by authorities concerned that the Soviet Union is approaching Ceylonese authorities with a similar plan but involving a loan of $30 million to be repaid over a 12-year period with interest at 2.5 percent.

Since the Japanese Import-Export Bank loan which the Ministry of Agri-

Ceylon (Contd.):

culture and Forestry had been pushing was for a smaller amount, the Ceylonese have not shown much interest in it. The Japanese plan had also run into much domestic opposition because it involved the supplying of tuna fishing boats to Ceylon. Under the circumstances, the Ceylonese may break off negotiations with Japan and accept the Soviet proposition. (Suisan Keizai Shimbun, August 6, 1959.)

Colombia

CANNERY ARRANGES FOR DIRECT DELIVERIES OF JAPANESE TUNA:

A Colombia packing plant, located in Barranquilla, announced early in September that it has made arrangements with the Japanese fishing vessel Seiun Maru to deliver a considerable quantity of frozen tuna. The Japanese vessel, which has been fishing in Colombia waters for some time, has refrigerated space for 250 tons of fish and the first consignment to Barranquilla is for 40 tons.

The packing plant plans to can the tuna to help meet the Colombian demand for fish.

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JAPANESE TUNA VESSEL LANDS TRIP FOR FISH CANNERS:

On August 31, the 230-ton Japanese tuna fishing vessel Seiun Maru docked in Barranquilla with about 50 tons of tuna caught on the high seas off Jamaica. The Seiun Maru has a 33-man fishing crew in its complement. The ship is working under a purchase agreement with a Barranquilla cannery. In addition, part of the catch was expected to be purchased by two other canneries on the north coast of Colombia, one in the town of Cienaga, Department of Magdalena, and the other in the city of Santa Marta, which is near Barranquilla. (United States Consulate report, Barranquilla, August 31, 1959.)

Cuba

CLOSED SEASONS ON CERTAIN FISH ENDED:

The Cuban National Fisheries Institute of the Cuban Maritime Development Agency announced the end of the closed season originally imposed on April 1, 1959, on the capture of mojarras (perch), jotoru, biajaca (tripletail), and dajao, effective July 25, 1959. The order was published in the Official Gazette No. 135 of July 25, 1959. Also in the same issue was published a Resolution ending the closed season originally imposed on April 5, 1959, on the capture of biajaiba (lane snapper), effective August 15, 1959. A later resolution published in the Offical Gazette No. 144 revised the effective date to August 8, 1959.

A Resolution revoking the closed season on the capture of sponges, originally imposed on May 5, 1959, north of Caibarien and south of Batabano was published in the Official Gazette No. 143 of August 5, 1959, effective August 15, 1959. (United States Embassy report, Habana, August 18, 1959.)

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CLOSED SEASON FOR OYSTERS ENDED:

The National Fisheries Institute of the Cuban Maritime Development Agency terminated the closed season on the capture of oysters effective September 14, 1959. The closed season on oysters was originally imposed on June 10, 1959.

A Resolution announcing the above termination was published in the Official Gazette No. 166 of September 4, 1959. (United States Embassy report, Habana, September 10, 1959.)

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CLOSED SEASON FOR SNAPPER AND MORO CRAB:

The Cuban National Fisheries Institute (Instituto Nacional de la Pesca) of the Cuban Maritime Development Agency (Fomento Maritime Cubano) announced a closed season on Cuban snapper (cubera), grey snapper (caballerote), and Moro crab for the period beginning August 1, 1959, and ending October 24, 1959. Ac-

Cuba (Contd.):

cording to the Cuban General Law in Fishing a closed season of 84 lunar days is established for those species of fish and shellfish that require such protection during their spawning season. The above closed season, apparently setting a new trend in that both beginning and termination dates are shown, was published as a resolution in the Official Gazette No. 139 of July 29, 1959. (United States Embassy report, Habana, August 24, 1959.)

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QUOTA FOR 1959 CANNED BONITO IMPORTS:

The Cuban Minister of National Economy in a Resolution published in the Official Gazette No. 126 of July 10, 1959, fixed a maximum total import quota of 1,010,200 pounds of canned bonito which may be brought in by Cuban importers during 1959.

The stated reason for the quota appears to be an attempt to keep imports of canned bonito within reasonable limits pending the implementation of the new Cuban customs tariff reforms.

It is interesting to note that imports of canned bonito as reported by the Cuban National Fisheries Institute (Instituto Nacional de la Pesca) for 1958, however, only amounted to 805,530 pounds which is considerably under the 1959 quota. Approximately two-thirds of all Cuban bonito imports normally originate from Spain.

Eighty percent of the 1959 quota is reserved for regular commercial importers of canned bonito who were engaged in that line during the three-year period 1955-57. The remaining 20 percent of the quota is allotted to occasional bonito importers who have been engaged in that line during the first five months of 1959. Importers who exceed their self-declared quota may sell or assign such imported bonito to other importers who still have an unfilled quota. (United States Embassy report from Habana, August 4, 1959.)

Egypt

FIRM EXPANDS FACILITIES FOR FREEZING SHRIMP:

A company established in mid-1957 for the canning of fruits and vegetables at Siouf, Egypt, during 1958 processed and froze a sizable quantity of shrimp for Alexandria exporters. This cannery, which is controlled by the Egyptian Government Economic Organization and in which an American Company has a minority interest, hopes to enter the frozen shrimp export business in 1960.

The company's cannery has recently rebuilt and expanded its freezing facilities at a cost of about $40,000 and will be ready for operation by the beginning of the new shrimp season in November 1959. The new facilities, housed in a separate building, consist of shrimp holding space (15 tons at about 34° F.-41° F), cleaning and grading areas, and frozen storage space (60 tons at about -4° F.), in addition to the contact freezing units themselves. All of this equipment is of United States manufacture. This expansion will quadruple previous capacity. In order to take advantage of this facility, however, it will be almost essential to obtain the services of a well-trained expert in the shrimp freezing business. (United States Consulate report from Alexandria, September 2, 1959.)

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JAPANESE FISHERY PLANTS RECEIVED:

Egypt received in mid-August 1959 four plants from Japan in accordance with an agreement signed in November 1958 under the $30.0 million Japanese industrialization loan to Egypt.

The plants, which were unloaded in Cairo, are for manufacturing fishing nets, cans for preserving fruit, shrimp freezing and preservation, and fish packing.

France

NEW TYPE TUNA-TRAWLER VESSEL SUCCESSFUL:
For some months this year two dual-purpose vessels of a new type have been fishing for French owners. The new class could be described as trawler-tuna boats, and they have already proved themselves capable of carrying out either form of fishing with equal efficiency.

The two vessels in question are the Cote d' Argent and the Simone Valentine.

The principal particulars are: length over-all 91 ft. 10 in.; length between perpendiculars 78 ft. 9 in.; breadth 22 ft. 8 in.; depth 12 ft. 1 in.; refrigerated fish hold capacity 2,825 cu. ft.; fish well capacity 1,413 cu. ft.; fuel capacity 9,250 gallons.

Both vessels have a gross tonnage of 250 tons, and are built to the highest Bureau Veritas standards in their class.

While a number of tuna boats habitually practice trawling also, this is the first time that a basic design has been evolved for dual-purpose fishing of this type, and their form has been somewhat influenced by that of the United States tuna clipper. The reason for this new departure lies in the limited period during which tuna fishing can be practiced off the French and Spanish coasts, namely from May to October. While the fishing still continues off the African coast, this presents certain problems of marketing, and of preservation and transportation in medium tonnages. The decision was therefore taken by the owners, to build vessels that could engage in live-bait fishing in season, and afterwards turn to trawling or sardine fishing. Although there were some misgivings at first as to sea-keeping qualities and crew-accommodation problems, the results of some two years' research was reassuring, and the decision was taken to build.

The vessels are of all-welded steel construction, zinc-sprayed where necessary, and are flush-decked, except for the forecastle, which is slightly raised to accommodate twelve 3-tier bunks for the crew, the number of which varies according to the type of fishing in progress. Access to the crew's quarters is by a passageway below deck, opening on to the superstructure. Leading off this passageway is the mess room, galley and cook's quarters, and access to the engineroom, though in fine weather this is entered from the deck.

The engineroom is well forward, and houses main engines, auxiliaries, and refrigeration plant. The main engine of the Cote d'Argent is a V-8, developing 400 hp. at 1,250 r.p.m., and driving through an oil-operated reverse reduction gear of 4:1 ratio. The Simone Valentine is powered by V-12 type 12 v. 18/22, and this develops 450 hp. at 1,000 r.p.m., driving through a oil-operated gearbox having 3:1 reduction ratio. Both normally are bridge-controlled.

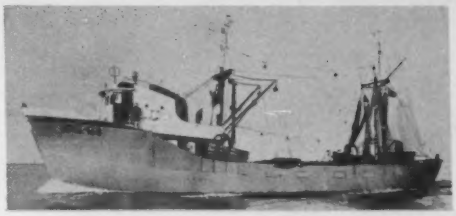
The intermediate shafts in both vessels are supported on roller bearings and pass beneath the refrigerated spaces in an insulated tunnel.

Auxiliary engines are in both cases two developing 50 hp. at 1,200 r.p.m. coupled to gearboxes through which the pumps, generators, and refrigerating units can be driven, and which, coupled together by a shaft, drive the hydraulic pump for the trawl winch. In the event of main-engine failure the auxiliaries can be coupled to the propeller shaft and a speed of 5 knots can be achieved. The auxiliaries to be driven include 2 pumps for circulating water in the bait tanks, each of 150 tons per hour capacity; 2 refrigeration units, a general service pump, an exhaust pump, and a 2-1/2 kw. and 6 kw. generator.

Aft of the engineroom are the live-bait tanks, two on each side of the vessel, separated by a refrigerated compartment, which in turn gives access to the cold-storage room. Right aft is a large storage room. Fuel is stored in double-bottom tanks and in 4 lateral tanks.

All the living quarters are insulated and the floors are rubber-covered.

The refrigerated compartments of the Cote d'Argent are cooled by cold-air circulation, and those of the Simone Valentine by pipes around the chambers. High and low-temperature safety controls are fitted, and temperature control is to within 1/2 a degree approx., the minimum temperature being in the region of 5°F.



The trawler-tunny boat Cote d' Argent.

The bait tanks are of steel sheet, the interiors being zinc coated. Sea water for the conservation of live bait is circulated from the tank bottom. They are insulated with thick cork, as they are also capable of being cooled to below freezing point by immersed refrigerating coils, to serve as cold storage, refrigerated brine tanks, or quick freezers.

The steering gear favored for these vessels is the irreversible-direct hydraulic type, in preference to rod and chain.

The trawl winch also is hydraulically-operated and is fitted aft of the superstructure. Other deck features include small bait tanks and the usual gunwale ramp for tuna fishing, both to starboard. Detachable gallows are fitted on either side.

A laminated unsinkable ship's lifeboat is provided, and two inflatable liferafts are mounted on the bridge, where navigational equipment includes an echo-sounder, fish-finder, navigator, and radiotelephone.

Both vessels have fished profitably from French and Spanish ports in depths approaching 200 fathoms, and the owners are satisfied with their new venture.

German Democratic Republic

EAST GERMANY BUILDS MORE FISHING VESSELS:
Under the new seven-year plan for East Germany, its shipyards in Rostock, Warnemunde, Wismar, and Stralsund will build over 500 freighters, passenger vessels, and fishing craft, according to a report in Dansk Fiskeritidende (July 17, 1959), a Danish fishery trade paper. Sixty-seven of these will be fishing vessels designed for fishing in distant waters in the South Atlantic. Each of these distant-water vessels will measure 2,900 tons and be built in Stralsund.

German Federal Republic

NEW FISHERY RESEARCH INSTITUTE:
A new research institute for fishery economics and fishery policies has been registered in Bremen, according to a re-

German Federal Republic (Contd.):

port in Dansk Fiskeritidende (July 10, 1959), a Danish fishery trade paper. Its Director is Dr. Wilhelm Blanke who also is head of the State's research office for fisheries of the Commission for Economic Research in Bremen.

The new institute has been formed to investigate fishery economic and fishery policy problems on a scientific basis. It is the first of its kind both in Western and Eastern Europe. As a more flexible organization than the research office, it will supplement the latter's work, which because of its character as a State organization works too slowly to be able to make prompt decisions and regulations. The institute hopes to have all the trawler companies as well as other fishery industries as its members. The first problem will be to clarify the economic basis for the use of new fishery areas in the North Atlantic.

Ghana

UNITED STATES PACKING COMPANY SIGNS AGREEMENT TO MAKE TUNA SURVEY:

The Minister for Economic Affairs of Ghana, who is also the Minister responsible for Commerce and Industry, on behalf of the Ghana Government, signed an agreement late in August with a United States west coast tuna-packing company.

The company will carry out, in conjunction with the Ghana Fisheries Department, a survey to determine:

(1) The most effective method of capturing the available tuna and other pelagic fish, and the type of vessels best suited for the work.

(2) The feasibility of the project and economic studies relative to the establishment of a tuna-freezing and canning industry at Tema.

(3) The abundance and availability of tuna within a thousand-mile range of Tema.

(4) The abundance and availability of tuna bait along the coast of Ghana.

(5) The availability of other shoal fish susceptible of being processed at Tema.

(6) The feasibility and economic studies relative to the establishment of a wet-fish industry at Tema.

The survey, which is being financed jointly by the Ghana Government and a United States firm, will prove the feasibility of establishing a deep-sea fishing industry based at Tema with shore establishments for canning, freezing, and the manufacture of fish meal. (Ghana Times, August 31, 1959.)

Iceland

SUMMER HERRING LANDINGS LARGEST SINCE 1946:

Iceland's herring catch off the north and east coasts has assumed unexpectedly large proportions in 1959--the largest summer herring catch since 1946 or

Iceland (Contd.):

1947. Record landings of 135,000 metric tons of herring were reported as of August 24, 1959, as compared to 62,000 tons at the same time in 1958. By the end of August 1957 it was expected that the boats would commence on the south coast herring fishery with drift nets.

An Icelandic fisherman.

The catch was of high fat content. Salting continued briskly after a 6-day pause until the Soviets took an additional 40,000 barrels. Salting towards the end of August slowed down as orders were filled.

Iceland's Summer Herring Landings and Utilization to August 15

	1959	1958
	(Metric Tons)	
Used for:		
Salting	27,163	38,747
Reduction	98,631	26,742
Freezing	1,743	1,275
Total	127,537	66,764

A local newspaper estimated the export value of the north coast catch at Ikr. 72.4 million (US$4.4 million) for the salted and Ikr. 112.5 million (US$6.9 million) for the oil and meal, or a total of Ikr. 184.9 million (US$11.3 million). The same paper states the vessels were paid Ikr. 19.9 million (US$1.2 million) for the herring catch.

Herring used for salting purposes amounted to 201,204 barrels (298 pounds a barrel) as of August 15 and actual export commitments to that date were about 190,000 barrels (220 pounds a barrel). Therefore, they are roughly in balance. Contracts for north coast herring, which are now largely filled, come to 80,000 barrels to the U. S. S. R., 50,000 barrels to Finland, and 60,000 barrels to Sweden. This compares with advance contracts last year for salted herring amounting to 300,000 barrels (north and south coast). Negotiations were in progress for the sale of up to 8,000 barrels of salted herring to the United States from the north coast catch.

As for the south coast catch, only 40,000 barrels of salted herring have been signed for by the Soviet Union in advance, compared with 110,000 barrels sold last year. Trade agreements with East Germany and Poland call for 15,000 barrels and 20,000 barrels, respectively, of the south coast catch, but these amounts have not been contracted for as yet.

Meanwhile the relatively low prices prevailing for oil and meal was causing some concern to the reduction plants. According to the press, the Executive Manager of the State Herring Factories remarked that he hoped the sale of those products would be good in the fall, but that very little herring oil or meal has been sold so far. He added that 1,000 metric tons of meal have been sold to Iceland's chief fish meal market, Great Britain, but that the usually good West German market has been fully loaded with meal from Peru, Holland, and Denmark; sales of fish oil to Germany have been proceeding fairly well; however, some optimism prevailed that meal prices would rise this fall.

The manager of an oil and meal plant on August 13 said his plant had produced about 4,800 metric tons of meal and 1,000 metric tons of oil in 1958 with an export value of nearly $1 million (including the

Iceland (Contd.):

55-percent subsidy), but that he had on hand over 2,000 metric tons of fish meal undisposed of due to the low prevailing prices. He had sold his fish oil in advance to Norway at £72 10s. a metric ton (better than 9 U.S. cents a pound), but quoted August 1959 prices at about £62 a ton (less than 8 cents a pound).

Contracts for north and south coast salted herring to date therefore amount to 230,000 barrels, compared with 300,000 barrels contracted (288,000 filled) for last year. The herring salters made advance arrangements this year to salt 300,000 barrels. (United States Embassy report from Reykjavik, Aug. 20, 1959.)

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PLANS FOR TWO FISH CANNERIES UNDER STUDY:

The Federation of Iceland Cooperative Societies (whose members are responsible for 20 percent of the country's fish exports and all its agricultural exports) with the aid of Swedish engineers is completing studies for the erection of two canneries in Iceland. One would be built in or near Reykjavik to pack both fish and meat products and would cost about US$800,000. Another plant is planned for Akureyri to process fish products only and would cost about $200,000. Of this $1 million projected cost it is expected that the Federation of Swedish Cooperatives will provide about $800,000 in the form of a loan.

The Swedish Federation would export various products from its member cooperatives, which would be sold through the Icelandic Federation's cooperative retail outlets. The "counterpart" from these sales would help generate local currency for the construction of the canneries. Other segments of the Swedish loan would take the form of shipments of Swedish machinery, or, as necessary, advances of certain third country currencies for other foreign machinery purchases.

The fish products which the Icelandic Federation could pack in these plants, particularly if there is a demand in the United States and other free currency areas for them, are: herring in tomato or mustard sauce or natural style; sardines in oil or tomato sauce; fish balls; gaffelbiter (spiced herring in vinegar); spiced herring fillets; shrimp; and small lobster. Total annual fish canning capacity for the two plants is estimated at about 1,500 metric tons.

The smaller-scale meat canning would take the form of lamb in "Irish stew," and mutton and whale meat for pet food.

The Iceland Federation is anxious to increase its export sales in the United States and western Europe. In 1958 it exported fish products worth 143.4 million kronur (about US$8.8 million), of which 56.8 percent went to the dollar and western Europe areas, as compared with 45.5 percent in 1957. (United States Embassy report from Reykjavik, Sept. 9, 1959.)

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THREE NEW SHRIMP PROCESSING PLANTS BEING COMPLETED:

Three new shrimp-processing plants are being completed on the northwest coast of Iceland, two of which will shortly receive new shrimp-peeling machines from the United States. The shrimp catch has been good despite unfavorable weather conditions.

The shrimp, which is largely canned, goes to Great Britain. That which is frozen is shipped to the United States. This expansion is a further step towards further specializing in preparation of sea foods, the United States Embassy in Reykjavik reported on August 27, 1959.

India

SMALL MODEL FISH-MEAL PLANT DEVELOPED:

A demonstration of a small model fish-meal plant, developed by a United States-educated fisheries engineer, was held late in June 1959 at a fisheries plant in Bandra, Bombay, India. The plant was designed and built by the fisheries engineer with the help of an expert on boilers, for the manufacture of fish meal from nonfood fish and fish waste. The demonstration was attended by the Bombay Director of Fisheries, members of the Bombay Fish Meal Exporters' Associa-

India (Contd.):

tion, Japanese fisheries experts, and local fishermen.

The Director of Fisheries remarked: "I was very happy to see a small model of a fish meal plant made locally. This is an important and valuable step in the fish meal industry."

Fish meal is exported and is a source of considerable foreign exchange to India. Fish meal has been manufactured locally by sun-drying the fish on concrete floors, which is a laborious process, requiring some two to three days to complete the process, depending on weather conditions. In addition, the final product contained a large amount of sand, and the protein content was never higher than 50 percent.

This fish-meal plant is the first of its kind in India and is built entirely to suit local conditions. It requires no power and it consists of a double-jacketed dryer, a superheater, boiler and furnace, all built as one compact unit. The unique feature of this plant is that it can be operated on any fuel available, hence suitable for any part of the country, even when installed on fishing boats. The cost of operation is as low as Rs. 15 (about US$3.15) per ton of fresh fish, and requires only one man to operate it. It is so built that it does not come under the regular Boiler Act, hence it needs no registration. Each unit can handle some 5,000 pounds of raw fish per 24 hours, and the unit is expected to cost about Rs. 6,000 (about US$1,270).

Indonesia

FISHERIES--A MAJOR INDUSTRY:

The Union of Indonesian Fisheries Cooperatives (GKPI) has announced that, according to data compiled by the Union, there are now about 400,000 fishermen in Indonesia. The fishermen operate 950 motor fishing vessels, and about 110,000 sailing craft of various sizes, the United States Embassy in Djakarta reported on September 14, 1959.

Fishing in Jakarta harbor, Indonesia.

Japan

ATLANTIC TUNA FISHERY:

The assistant chief of the fishing department of a large Japanese company returned to Japan on July 22, 1959, completing a full year of observations of the Atlantic tuna fishery bases at Haiti and Trinidad and tuna industry centers such as Ponce, Puerto Rico, and New Orleans, United States. He had the following to say about conditions in those areas:

Haiti is unsuitable as a tuna fishing base because of the lack of port facilities for fishing boats. After only 12 trips out of Haiti, the base was shifted to Trinidad. Trinidad is a shipping and distribution center linking North and South America and Europe, and has port facilities commensurate with the 10 or 11 ships of the 10,000-ton class that daily enter or leave the port. Petroleum resources are abundant, and fueling is easy.

As for the problem of the recently increasing claims against tuna exported from the Atlantic fishery to the United States, it looks as if the tuna taken off the Gold Coast from April to June are liable to have "green meat" or dark meat because they are in post-spawning condition. This official had personally examined tuna against which claims had been made at the cannery in

Japan (Contd.):

Ponce, and found that they were off-color, had off-odors, and were definitely substandard.

Two 150-ton United States boats were fishing in the Gulf of Mexico out of New Orleans. There, too, 20 percent of the fish taken in September and October was unsuitable for packing because of off-colors. He found it interesting that those boats were using Cremona line imported from Japan and operating in the same way as Japanese long-liners. (Nikkan Suisan Tsushin, August 4, 1959.)

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ATLANTIC TUNA FISHERY TRANSSHIPMENTS TO U. S. DROP SHARPLY:

A quota for this year of 120 trips was set for Japanese tuna fishing operations in the Atlantic for transshipment to the United States, but because of the large cannery claims against fish produced in May and June, the operator's interest in selling to the United States market has faded considerably. At the same time, Italy, Yugoslavia, France, and other European markets have welcomed Japanese tuna far above expectations, and vessels which were sent to the Atlantic with the primary object of exporting their catch to the United States are turning to direct exporting to Europe. As a result, it is anticipated that probably only about half of the quota of 120 trips will be used up.

Performance and plans for the first half of the export year, from April to September, show only 30 trips for export to the United States and 41 trips for European markets. (Nikkan Suisan Tsushin, August 17, 1959.)

Plans for Japanese Atlantic Tuna Fishery Transshipments, April-September 1959

Month	U. S.		Italy		Yugoslavia		Other European	
	Shorts Tons	Trips	Short Tons	Trips	Short Tons	Trips	Short Tons	Trips
April	1,039	4	760	2	977	3	-	-
May	3,397	9	595	2	-	-	-	-
June	1,460	5	1,310	3	492	2	476	2
July	1,110	4	1,974	7	910	2	420	1
August	640	4	734	4	750	3	1,560	4
Sept.	1,095	4	400	2	980	2	690	2
Total	8,841	30	5,773	20	4,109	12	3,146	9

It is considered that most of the deliveries to France (2,456 tons) and other countries (690 tons) and a part of the deliveries to Yugoslavia are being or will be shipped to Italy.

The export quota to Italy has been set this year at 12,000 tons. But it is reported that more than 3,000 tons of Japanese tuna has already entered Italy by transshipment from France and North Africa. If the sales of this tuna were made with knowledge that it would be diverted to Italy, it clearly constitutes a violation of the Japanese Government's export control measures, but there is no way of controlling this situation. At present there is absolutely no fear that these transshipments will break the Italian market, and the base price of $280-$285 c. & f. is being maintained. The present quota of 12,000 tons for Italy far from meets the demand. There has been no quota set up for the other European countries receiving Japanese tuna. (Nikkan Suisan Tsushin, August 21, 1959.)

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FROZEN TUNA EXPORTS, APRIL 1958-MARCH 1959:

During the Japanese 1959 fiscal year (April-March), 113,107 short tons of frozen tuna (valued at US$30.6 million) were exported to the United States, Italy, and six other countries. The exports to the United States consisted of 67,148 tons of yellowfin (value US$17,388,000), 27,207 tons of albacore (value $8,772,000), and 6,195 tons of other tuna (value $1,573,000). The United States imports of Japanese frozen tuna accounted for about 89 percent of the quantity and 90 percent of the value of the total frozen tuna exports. Japan's only other important customer for frozen tuna was Italy. This country imported 11,460 tons of yellowfin (value $2,531,000) and 77 tons of albacore (value $17,000).

In the latter half of 1958 and the first quarter of 1959, exports of Japanese frozen tuna caught in the Atlantic Ocean and shipped to the United States and Italy without being landed in Japan, began to play an important part in the export trade in frozen tuna. (See table on following page.)

Japan (Contd.):

Japanese Exports of Frozen Tuna by Destination and Species, April 1958-March 1959

Destination	Quantity					Value				
	Albacore	Yellowfin	Skipjack	Big-eyed	Total	Albacore	Yellowfin	Skipjack	Big-eyed	Total
	(Short Tons)					(US$1,000)				
From Japan:										
United States	25,862	48,358	2,752	1/ 3,443	80,415	2/ 8,772	12,981	531	3/ 842	23,126
Canada	948	-	-	-	948	466	-	-	-	466
Other	3	68	1	-	72	1	15	-	-	16
Atlantic Ocean Fishery:										
United States	1,345	18,790	-	-	20,135	-	4,407	-	-	4,407
Italy	77	11,460	-	-	11,537	17	2,531	-	-	2,548
Total	28,235	78,676	2,753	3,443	113,107	9,256	19,934	531	842	30,563

1/Includes 10 tons of unclassified tuna.
2/Includes value of albacore delivered to U. S. from Atlantic Ocean fishery.
3/Includes value of 10 tons of unclassified tuna.
Note: Shipments of frozen tuna to "other" countries included small quantities to Belgium, France, Netherlands, United Kingdom, and Guam.

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SUMMER ALBACORE TUNA FISHERY TRENDS:

With the Japanese summer albacore fishery drawing to a close at the end of July, landings were averaging about 150 metric tons daily. The albacore schools were moving east and late catches were being made at about 31°10'-32°30' north latitude and 158°00'-158°50' east longitude.

As the end of the season approached purchases by freezers of summer albacore increased and as of July 25 they were reported to have purchased 500-600 metric tons. In July there was less competition from the tuna canners for available supplies of albacore and ex-vessel prices and export prices were about in balance. Some sales of frozen albacore were reported to have been made to United States canners at US$390 a ton f.o.b. Japan. A backlog of unfilled orders for frozen albacore, amounting to 1,000-2,000 tons which were originally booked at $320 a ton f.o.b., makes it difficult to book new orders.

Almost all the tuna canners, with the exception of three large firms, had completed canning their production quotas of at least 35 percent whitemeat tuna by the middle of July. As a result, ex-vessel tuna prices dropped from about $452 a ton late in June to about $252-365 a ton in July. If the frozen albacore tuna exporters can maintain the export price of $390-400 a ton, no losses will be taken.

One of the large Japanese fishing companies in July was offering mothership-caught albacore for export to the United States. The first shipment was sold to a west coast United States canner at $360 a ton f.o.b. This large Japanese firm estimates that about 4,000 tons of mothership-caught albacore will be available for export to the United States from the 1959 season. Almost all of this quantity is expected to be sold to a single United States tuna canner. (Nikkan Suisan Tsushin, September 28, 1959.)

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TUNA CANNERS TAKE STRONG POSITION ON SALES POLICIES:

Shizuoka Prefecture tuna canners held a meeting on July 31, 1959, at Shimizu and discussed measures to overcome the continuing slowdown of canned tuna sales to the United States market. The majority of the larger packers were present. The meeting agreed on three goals: (1) maintenance of the present price for lightmeat; (2) a $1.50 per case increase from the going price for whitemeat (which would be $2.50 above the price at the last round of sales); (3) an early reopening of sales by the Joint Sales Company.

The packers' strong position is considered to be supported by the whitemeat production which has been greater than expected, and it will be possible to sell 400,000 cases of whitemeat, so that the relative importance of lightmeat sales has decreased.

This unilateral agreement by the Shizuoka packers does not, of course, have the binding effect of a decision by any formal body, but it is considered certain that the packers' officials will in fact be-

Japan (Contd.):

gin negotiating along these lines with the trading companies. However, it seems likely that the trading companies, which have been calling for a $1 a case price cut on lightmeat, are going to accept the packers' position. (Nikkan Suisan Tsushin, August 4, 1959.)

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TUNA INDUSTRY TRENDS, JULY 1959:

Exports: The value of Japanese tuna exports to the United States in the first 5 months of 1958 was US$5,976,000 frozen tuna and $5,154,000 canned tuna; for the same period of 1959 exports were $8,861,000 frozen tuna and $3,657,000 canned tuna, according to Japanese Customs data. (See tables 1, 2, and 3.)

July 1959 status of export quotas for United States was approximately 30,000 short tons annually of round albacore. For yellowfin shipped from Japan 35,000 tons, for yellowfin transshipments through foreign ports 120 landings, equivalent of approximately 35,000 tons. For albacore and yellowfin loins and discs combined 3,000 tons annually, which must be subtracted from round fish quotas at rate of 2 to 1. Samoa and New Hebrides exports are not included in these quotas.

Quotas for canned tuna in brine exports are determined by the United States tariff structure and consumption. Practically no tuna in oil is exported to the United States. Japanese canned tuna industry planning on 1959 exports to United States of approximately 2,450,000 cases.

Table 1 - Japanese Frozen and Canned Tuna Export Validations for Shipment from Japanese Ports 1/

Product	Jan.-June 1959		Jan.-June 1958		Year 1958	
	To U. S.	To All Countries	To U. S.	To All Countries	To U. S.	To All Countries
	(Short Tons)					
Frozen:						
Albacore, round	8,905	9,409	11,951	11,952	21,537	21,637
" loins	752	1,036	8	8	317	402
" discs	-	9	-	-	-	-
" flakes	16	16	74	74	84	84
Total albacore	9,673	10,470	12,033	12,034	21,938	22,123
Yellowfin, gilled & gutted	18,822	19,230	17,192	17,204	39,366	39,435
" loins	874	874	-	-	437	437
" discs	-	-	-	-	-	-
" fillets	1,266	1,295	3,206	3,206	6,627	6,627
" dressed	-	570	-	121	-	121
" chunks	-	24	9	-	-	-
" flakes	2	2	-	-	-	-
Total yellowfin	20,964	21,995	20,407	20,531	46,430	46,620
Total frozen	30,637	32,465	32,440	32,565	68,368	68,743
	Jan.-April 1959		Jan.-April 1958		Year 1958	
	(Standard Cases)					
Canned:						
Albacore, in oil	-	124,178	-	121,078	236	242,971
" in brine	245,137	245,137	485,576	485,576	1,311,314	1,312,265
Skipjack, in oil	-	58,432	-	18,470	479	315,779
" in brine	298,239	298,239	205,252	205,252	731,102	742,290
Other lightmeat, in oil	-	143,267	-	123,838	1	313,505
Other lightmeat, in brine	8,850	8,850	25,670	25,670	66,220	67,623
Miscellaneous	9	11,621	-	2,116	3,267	51,477
Total canned	552,235	889,724	716,498	982,000	2,112,619	3,045,910

1/Does not include transshipments from other countries. Data supplied by Japan Frozen Food Exporters Association.

Table 2 - Japanese Fresh and Frozen Tuna Transshipment Exports to United States from Direct Landing at Cristobal, Trinidad, and Haiti 1/

Product	Jan.-June 1959		Jan.-June 1958		July-Dec. 1958	
	Short Tons	US$	Short Tons	US$	Short Tons	US$
Yellowfin	15,064	3,638,794	2/	2/	10,241	2,632,917
Albacore	1,060	321,861	2/	2/	515	178,865
Total	16,124	3,960,655	2/	2/	10,756	2,811,782

1/Export license validations. Data supplied by Agricultural and Fishery Products Sections of MITI. From Japanese vessels fishing in the South Atlantic.
2/No fishing in Atlantic first part of 1958.

Prices for Frozen: In July 1959 official Japanese frozen tuna export check or floor prices f.o.b. Japan per short ton were: albacore round $270, loins $730, discs $780. Yellowfin gilled and gutted up to 80 pounds $220, 80 to 100 pounds $210, over 100 pounds $190. Yellowfin dressed up to 120 pounds $210, over 120 pounds $190. Yellowfin: fillets regardless of fish size $210, loins $565, discs $615. Check prices for yellowfin transshipped through Panama $10 less

Japan (Contd.):

per short ton for all types. Although the tuna check or floor prices have not been increased, actual export prices are about $360 a ton f.o.b. for round mothership albacore and the Japanese Frozen Food Exporters' Association were reported to have raised the basic price for 20-80 pound (gilled and gutted) yellowfin tuna to $245 a ton f.o.b., effective July 3, 1959. Price of yellowfin gilled and gutted delivered to Puerto Rico by large Japanese fishery carriers was reliably reported as $250 per short ton c. & i. Basic price of yellowfin delivered to American Samoa was reported as $190.

Table 3 - Japanese Direct Landings of Fresh and Frozen Tuna at American Samoa and New Hebrides[1/]

Product	Year 1958
	Short Tons
Albacore	10,096
Yellowfin	2,254
Big-eyed	317
Total	12,667

1/Export license validations. Japanese policy is to limit American Samoa deliveries to 12,000 tons and New Hebrides deliveries to 3,600 tons annually. Deliveries to those islands are over and above Japanese over-all frozen albacore and yellowfin export quotas, but direct landings at and transshipments from Carribean ports are included in over-all quotas.

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TUNA MOTHERSHIP FLEET OPERATIONS IN SOUTH PACIFIC NEAR THE FIJI ISLANDS:

When the 3,710-ton Japanese tuna mothership Tenyo Maru No. 3 visited Suva, Fiji Islands, August 10, 1959, the fleet's fishing manager reported that fishing had proved very good since the ship left Japan. As of the date of the visit, 3,300 metric tons of the fleet's quota of 5,400 tons had been caught, and 56 percent of the catch was albacore tuna. The fleet expected to fill its quota by the end of August, at which time the mothership was expected to leave the fishing area--about 300 miles southwest of Suva--and return to Tokyo. The fleet's 35 tuna catchers were then to be serviced by the 7,600-ton mothership Koyo Maru, which was due in the area on September 1.

An additional 15 catcher boats were expected to join the 35 catchers already in the area. The Koyo Maru had a tuna quota of 5,700 tons.

Because the fishing had been poor in waters nearer Japan, the Fishery Agency was issuing a permit for an extra mothership fleet in the South Pacific this year--making four in all.

The mothership Jinyo Maru, 7,200 tons, built last year, was also scheduled to leave Tokyo on September 1 to operate in the area west of the Gilbert and Ellice Islands. This mothership is owned jointly by the owners of the other two motherships mentioned above. The Jinyo Maru has a catcher fleet of 30 boats and a tuna quota of about 5,700 tons.

Taking into consideration the 5,700-ton quota of the fourth mothership fleet operating in the South Pacific, there would be a total harvest of 22,500 tons from Japanese motherships in the South Pacific this year.

In addition, there are about 30 independent tuna boats, averaging about 250 tons gross each, or somewhat larger than the fleet-type catcher boats.

The Japanese Fishery Agency fixes the mothership quotas each season on the basis of results of earlier seasons. According to the Japanese, this season's catch and especially the high percentage of albacore in the catch, gave no indication that the Gilberts-Ellice-Fiji area was being overfished as yet.

The Nojima Maru, the fourth mothership, commissioned last December, visited Suva on August 5. This mothership left Kobe on May 15 for the South Pacific where she rendezvoused with her 36 tuna catcher boats two weeks later near the Ellice Islands, and within a few hundred miles of the Tenyo Maru No. 3, which had sailed from Tokyo on May 18 for the same area. At the time the Nojima Maru called at Suva, it had taken aboard 2,700 tons of fish of which 950 tons had been transshipped to the freezer vessel Aiko Maru in two shipments to Japan. The Nojima Maru expected to attain its quota of 5,700 tons by the end of September. The vessel was stationed near 22° south

Japan (Contd.):

latitude, 177° east longitude, within 70 miles of the Tenyo Maru No. 3. Both fleets worked their way south gradually along the west side of the Ellice Islands and Fiji. The tuna catcher boats of both fleets were operating over a wide area, some of them almost 1,000 miles from their respective motherships. The mothership Nojima Maru has a crew of 64 and 140 fish handlers. The crew of the Tenyo Maru is 55 and it also carries 119 fish handlers. (Letter from J. P. Shortall, Suva, Fiji, August 11, 1959.)

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TUNA VESSEL CONSTRUCTION CONTINUES AT HIGH RATE:

The Japanese tuna fishing industry at present is in rather good condition, and the large fishing companies are taking an optimistic view of its future, according to Suisan Keizai Shimbun (August 19 and 25, 1959), a Japanese periodical. Many Japanese firms are very enthusiastic for the tuna fishing business, and each are planning the construction of from 2 to 5 new vessels to add to their present tuna fleets.

All Japanese companies seem to be aiming at the tuna fishery, which, although smaller in scale than Antarctic whaling or North Pacific salmon fishing, is stable, and with plans for advance bases overseas, it looks as if the expansion of the tuna fishery next year will be more active than this year. One company has two 410-ton tuna vessels under construction and is also planning to buy a 500-ton vessel. One whaling company is building four 500-ton vessels, another a vessel of 680 tons, and a third company a 240-ton vessel.

In some quarters it is feared that this build-up of the tuna fleet may lead to depletion of the resources, but the majority opinion is that the question at present is not one of overfishing, but of finding good fishing grounds. On the trade front, there is optimism about the development in the future of markets other than the United States and Canada.

On August 19 a reception was held at the port of Yaizu for the new tuna longliner No. 3 Shoyu Maru. The vessel was built at Shimizu at a cost of 115 million yen (about US$322,000), has such modern equipment as radar, fish-finder, electric harpoon, and well ventilated and insulated living spaces. Freezing capacity is 110 tons, carrying capacity full loaded is 230 tons of tuna, and the vessel can cruise for 150 days. The No. 3 Shoyu Maru will start her maiden voyage to the Indian Ocean around the end of August. Her over-all length is 44.4 meters (146 feet), beam 8 meters (26 feet), and she has a maximum speed of 13 knots with a 800-horsepower Diesel.

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FISHING VESSEL BUILDING PERMITS ISSUED BY JAPANESE FISHERIES AGENCY:

According to a summary table attached to the announcement of fishing boat building permits issued by the Japanese Fisheries Agency on August 7, 1959, the number of permits issued from the first of April 1959 through the first week in August totaled 333 vessels, representing 24,491 gross tons. The largest category was tuna vessels, with 88 permits issued. These included 21 steel vessels totaling 7,172 tons and 67 wooden vessels totaling 3,655 tons.

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TUNA FISHING COMPANIES OPERATING OUT OF AMERICAN SAMOA ASK FOR QUOTA INCREASE:

The two Japanese companies which are fishing for tuna out of American Samoa for the cannery in that Territory early in August made a joint request for an increase in the quota of tuna that they can handle, giving as reasons the expansion of tuna-processing facilities at Samoa and the stability of the operations.

The Japanese authorities appear disposed to grant this request on condition that the contract price of tuna supplied to the cannery is first raised above the August level. (Nikkan Suisan Tsushin, August 18, 1959.)

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Japan (Contd.):

TUNA VESSEL OPERATORS HOPING FOR MORE FUELING PORTS IN FOREIGN COUNTRIES:

Ports where Japanese tuna vessels can fuel in foreign countries now number more than 20, but the operators are hoping for a further increase in fueling bases close to the fishing grounds. At present the Ministry of Transportation has given to almost all fishing vessels of more than 200 tons gross the status of vessels engaged on foreign runs, and they are freely entering foreign ports for refueling. Even vessels which lack this status are, in some cases, fueling at foreign bases with the special permission of the foreign government.

Principal fueling bases at present are Madagascar, Capetown, Singapore, Colombo, Mobasa, Cristobal, Trinidad, Haiti, Recife, Belem, Dakar, Casablanca, Venice, Naples, Palermo, Port Said, Suva, Tahiti, Samoa, and Curacao. In general base arrangements are adequate for the Mediterranean and African areas, but the problem is considered to be bases for transshipments to the United States. (Suisan Keizai Shimbun, July 18, 1959.)

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PRELIMINARY TALKS HELD ON UNITED STATES-JAPAN MEETING ON TUNA PROBLEMS:

Preliminary Japan-United States talks on intergovernmental meeting on tuna problems began at the Japanese Agriculture Ministry's Sanbancho Annex on August 14, with the Japanese Agriculture Minister and the Fisheries Agency Director and Vice-Director on the Japanese side, and the United States Economics Minister and Fisheries Officer on the United States side. When the U. S. Secretary of the Interior visited Japan on July 26, met with the Foreign Minister, the Minister of Trade, and the Minister of Agriculture, and proposed an intergovernmental meeting, with participation of industry representatives, on technical aspects of tuna fishing, processing, and trade. Thereafter the matter was brought up concretely in talks between the Japanese Foreign Minister and the United States Ambassador and this led to the August 14 meeting.

At the August 14 meeting the United States representatives showed a desire to hold an intergovernmental tuna conference at Washington during September for a period of two weeks and with the delegations of each side to comprise 10 persons.

To this the Japanese side countered that Japan has set up a tuna regulatory council and is striving unilaterally for the stabilization of the United States tuna market, so that intergovernmental negotiations are inappropriate. If necessary, it is desirable that talks be held only at the industry level. The Japanese showed an intention to consider specific problems further at the level of working officials.

With respect to the five points proposed by the United States--(1) investigation and conservation of tuna resources, (2) improving the efficiency of tuna fishing, (3) tuna processing technology, (4) improving the efficiency of marketing, and (5) expansion of tuna markets--the Japanese argued back as follows: (1) the study of tuna resources is very difficult at present, so Japan would like to carry on the exchange of data among Japanese and United States research agencies; (2) Japanese and United States tuna fisheries are basically different, so it would have little effect to discuss them; (3) the Japanese tuna industry is constantly making positive efforts, so it is inappropriate to make this the subject of debate between governments; (4) Japan has set up a regulatory council and is giving thought to the condition of the United States market, so intergovernmental talks are inappropriate; (5) Japan has set up a special agency (the International Tuna Council) on the Ministry of Trade's budget and has requested United States participation, but this has not materialized because of a lack of unity in the United States industry.

The Japanese side proposed that talks should be carried on at the industry level, but the United States representatives held out for intergovernmental talks, and that is how the preliminary meeting ended. (Suisan Keizai Shimbun, August 15, 1959.)

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RESTRICTIONS ON HIGH-SEA FISHING:

Japan's salmon fishing fleet of 460 ships sailed out of Hakodate on May 15, 1959, for the fishing

Japan (Contd.):

grounds in the North Pacific Ocean. The annual departure has always been festive, with banners and bunting decorating the vessels. This year, however, their departure was not as spectacular for two reasons.

The protracted Japan-Soviet fishing negotiations delayed the sailing and Japan's salmon quota for this year was drastically reduced.

From ancient times, the Japanese have relied on the sea for much of their daily food. The waters which surround Japan abound in many species of edible fish, and have been the principal source of animal protein in the Japanese diet. Because some 90 million people have to live in an area of only 142,644 square miles, fish has become even more precious as a source of food.

For several years after the end of World War II, Japan was able to fish only in coastal waters because of Occupation restrictions and the loss of practically all her fishing vessels during the war.

With the abolition of the restrictions and the signing of the San Francisco Peace Treaty, the Japanese fishing industry made a remarkable recovery. Today, Japanese fishing vessels are operating in the Arctic, Antarctic, and Indian, Atlantic and Pacific oceans. They are seen even in such distant places as South American waters.

Japan's total exports of fishery products now come to about $160 million annually (1958) and catches total 5,400,000 metric tons. Japan today is the leading fishing nation in the world, accounting for approximately two-fifths of the world's total haul. However, the operations of the Japanese fishing industry on the high seas are being subjected to certain restrictions.

The third Japan-Soviet fishery negotiations which opened in Tokyo in January 1959 were finally concluded after four months of protracted and difficult talks. Although negotiations on Japan's crab quota had already been settled in May, with Japan's catch curtailed to 280,000 cases or 10 percent less than last year, the talks on the crucial problem of Japan's salmon quota were not completed until May 13, after the salmon fishing season had already started. Japan's salmon catch in the area regulated by the Japan-Soviet Fisheries Convention was fixed at 85,000 metric tons as compared to 110,000 tons for last year and the 120,000 tons permitted for 1957. Thus, the results of the negotiations were not satisfactory to Japan.

The first Japan-Soviet fishery negotiations were held in 1956, with the aim of conserving salmon and other fish resources in North Pacific waters. The two countries agreed that the Japanese quota in the waters prescribed by the Fisheries Convention should be fixed annually by negotiations between the two countries. The Soviet Union has announced its own salmon quota every year but this has been merely a goal and does not mean that actual total catch must not exceed the announced quota.

During 1958 negotiations, the Japan-Soviet Fisheries Commission, established under the Convention, decided to suspend fishing in the Sea of Okhotsk during and after 1959. This decision was based on the consideration that the catching of salmon immediately before they went to their spawning grounds would not produce favorable conditions for their reproduction. This naturally narrowed Japan's salmon fishing grounds considerably.

Japan also concluded the North Pacific Fisheries Convention in 1952 with Canada and the United States. Uner this convention, Japan abstains from fishing for salmon of Canadian and American origin in the area west of 175° W. as well as herring and halibut off the coast of the North American Continent, while Canada and the United States continue to carry out necessary conservation measures for these species.

Two other restrictive areas are found west of the Japan Sea. These are the so-called Rhee Line, established unilaterally by the Republic of Korea, and the no fishing area established by Communist China. Proclamation of the Rhee Line by President Syngman Rhee in January 1952 has closed to Japanese fishermen a wide area of fishing grounds hitherto considered high seas. Although Japan does not recognize the validity of the Rhee Line, the Republic of Korea has been capturing Japanese fishing craft and crewmen operating near the line, and interning them. This is one of the focal points in Japan-Korea negotiations, and it was also taken up at the Geneva talks concerning the problem of repatriating Korean nationals living in Japan. Two Japanese women representing the families of men still held by the Korean Government went to Geneva to appeal for the return of their husbands and sons.

The off-limits fishing area along the coast of the Chinese mainland is based on the Fisheries Agreement between private interests of Japan and Communist China concluded in Peiping in April 1955. This agreement expired in June last year, but Japanest fishermen are continuing to abstain from operating in the area.

In 1953, Australia claimed jurisdiction over the continental shelf adjacent to its coast and also announced it would apply the Australian Pearl Fisheries Act of 1952/53 to all who engage in pearling outside the territorial waters within the continental shelf area. A dispute arose between Japan and Australia on these points, and hampered Japanese pearl fishing in the Arafura Sea. The Arafura Sea is located north of Australia and is famous for its mother-of-pearl oysters.

The term "continental shelf" is defined as referring to the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 meters or, beyond that limit, to where the depth of the superjacent waters permits the exploitation of the natural resources of those areas.

The two countries decided at the end of 1953 to refer their respective claims to the International Court at the Hague. However, an agreement was reached between Prime Minister Kishi and Premier Menzies when the former visited Australia at the end of 1957, to postpone indefinitely the appeal to the International Court of Justice. They agreed that Japan's pearl oyster catch would be limited to a certain quota to be fixed annually by negotiation be-

Japan (Contd.):

tween the two countries. However, in 1958, the International Conference on the Law of the Sea in Geneva recognized that living organisms belonging to sedentary species on continental shelves are to be exclusively claimed by the coastal countries. Thus, Japan's position concerning the Arafura Sea seems to have been weakened considerably. The Japanese catch of pearl oysters, 1,000 tons in 1956, was gradually curtailed and the 1959 quota was 375 tons as compared to 470 tons in 1958.

It was mainly because of the freedom to fish in the high seas--one of the fundamental principles of international law--that Japan managed to develop her fishing industry to its present high level. Unfortunately, however, this principle is being violated in some cases and Japanese fishermen are gradually being shut out from the high seas.

Three reasons can be found for the growing restrictions:

The first reason lies in the problem of conserving marine resources. It is generally agreed that catch quotas are necessary for the conservation of fish resources. However, because of the lack of scientific data on marine resources, the recent Japan-Soviet fishery negotiations ended without establishing why salmon resources are diminishing. If more thorough research were carried out in this direction a more equitable salmon quota could be fixed. Japan is willing to carry out a scientific study on salmon resources.

Another reason for the reduction of high-seas areas open to fishing is the expansion of territorial waters. It has been a standing international precept up to the present that territorial waters extend three nautical miles from a country's coast. But recently, some countries are claiming that waters extending 12 nautical miles and even 200 miles offshore are their territorial waters. During last year's International Conference on the Law of the Sea, Japan, as well as such countries as the United States, Britain, West Germany, Sweden and Greece, advocated a three-mile limit on territorial waters. However, South and Central American, Southeast Asian, Arab, and Communist nations claimed a 12-mile limit. No definite conclusion was reached by the conference.

The vast majority of opinion appears to favor limiting territorial waters to between 3 and 12 nautical miles. At any rate, it is urgently desirable that some sort of international decision be reached on this problem.

The third reason is concerned with the problem of distribution of marine resources from the standpoint of conserving fish resources. This problem, of course, is interrelated with the first reason. The problem lies in the fact that Japanese fishing operations in coastal waters are being restricted or completely shut out even though there is no scientific data to justify such a lockout.

For example, the Soviet Union in its negotiations with Japan claimed that it had priority in fishing for salmon because the salmon had been spawned in rivers in its own territory. In the case of the Japan-United States-Canada fishery agreement, the latter two countries have completely barred Japan from fishing in a certain area, claiming that the two countries alone are catching the allowable limit of the fish. Furthermore, it is reported that there are movements afoot in the United States Congress directed at further restrictions on Japanese salmon fishing.

At the four-nation whaling conference held recently in Tokyo--Japan, Britain, the Netherlands, and Norway failed to agree on the distribution among them of the quota catch of 12,000 whales.

The fishing industry not only provides the Japanese with necessary animal protein but also provides exports which earn needed dollars. Domestically, Japan must rationalize its fishing industry. This will necessitate extensive measures to alleviate the present plight of small fishing companies as well as individual fishermen. Japan must also devise means of utilizing the limited marine resources to their fullest. Many fishing firms have already initiated the canning or packing of fish meat into hams and sausages. However, there are certain limits to domestic measures, and if the situation continues as at present the Japanese fishing industry will be faced with increasing difficulties.

As one way to cope with the situation, some Japanese fishing firms are starting to develop new fishing grounds in cooperation with such countries as India, Burma, and Argentina which are trying to foster and develop their own fishing industry. (Japan Report, July 15, 1959, Consulate General of Japan, New York City.)

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TUNA FISHERY FEDERATION PUBLISHES WHITE PAPER ON INDUSTRY PROBLEMS:

Late in July the Japan Federation of Tuna Fishery Cooperative Associations issued a report entitled "The Present Situation and Problems of the Tuna Fishing Industry," copies of which were widely distributed within the fishing industry and in Government fishery administration circles. The purpose of the pamphlet is to express the Federation's opposition to a proposed redeployment of excess salmon fishermen into the tuna fisheries, and to explain the conditions in the tuna fishing industry which make the entrance of additional fishermen undesirable.

The report stresses the importance of the tuna fishing industry in Japan's economy, pointing out that tuna boats make up nearly 20 percent of the powered fishing boat tonnage and land nearly 10 percent by weight of Japan's total marine fisheries catch. Tuna products make up the biggest single category--over 28 percent--of Japan's fishery exports, which in turn are about 6 percent in value of all Japanese exports.

Japan (Contd.):

The industry is said to be in a generally weak financial condition. About 65 percent of the tuna boats are operated by individual owners, and most of the so-called company operations are small-scale and inadequately capitalized. An apparent decline in the abundance of tuna on near grounds has forced the operators to build larger vessels with which to reach more productive distant waters, and the lack of adequate capital or government financing for this building has put many of them in a precarious financial condition. Productivity appears to be on the down-grade even on the newer distant fishing grounds, while operating costs are going up as longer trips become necessary.

Among other serious problems of the industry, according to the report, are strongly fluctuating prices, inability to forecast accurately the seasonal abundance of fish, and very slow expansion of domestic consumption of tuna. The Federation is strongly opposed to any expansion of the over-all scale of production, i.e., the number of boats and fishermen, until a greater degree of stability has been achieved at the present level of development. Among the solutions proposed for some of these problems are changes in the government's regulations that would allow owners of boats of under 100 tons gross to build replacements of greater size and efficiency, which is not possible under the present licensing system, or the acquisition of rights to use bases closer to the tropical tuna grounds, so that smaller vessels could operate more efficiently.

The report shows a strong awareness of the importance of the export trade to the tuna fishing industry, stating that about 40 percent of the tuna catch is exported, and 80 percent of this to one market, the United States. With domestic consumption showing little growth, the only key to the future is held to be an orderly expansion of exports. In this connection, the report places great emphasis on the need for effective measures to prevent excessively cheap exports and to insure orderly marketing. (United States Embassy dispatch form Tokyo of August 6, 1959.)

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CANNED SALMON SALES OF 1959 PACK:

The first round of sales of canned salmon for the United Kingdom was closed by the Japanese Joint Sales Company on August 5, and it is certain that contracts will be made for the total quantity of red, pink, and chum salmon. Attention in the industry is now being centered on the timing and sales methods for the second round of sales. It was expected that between August 10 and 15, when private arrangements on silvers would have been ascertained, a supplementary sale would be held.

In some quarters an early supplementary sale on pinks is desired, but there is rather strong fear that for such a sale to be held before the goods sold in the first round reach their destinations might soften the market, and so it is considered certain that no such supplementary sale will be held at least until after announcement of the United States and Canadian opening prices, slated for the latter part of August. It is thought that if this is done, there may be considerable possibility of another price rise.

Of the canned salmon offered at the first round of sales, about 125,000 cases of 4-dozen red sockeye No. 2's and about 70,000 cases of 4-dozen pink No. 4's for early shipment were sold to the United States, and a second pink sale was scheduled shortly. The Joint Sales Company closed bidding by United States buyers for the time being on August 5, and will determine the amount of sales on that basis. However, the pack of pink No. 4's is less than half of the quantities ordered, and sales will probably be held within 200,000 cases. It is expected that quantities of pink No. 2's available will just about match the orders received. It seems most likely that the second round of sales will settle on a figure of about 300,000 standard cases. (Nikkan Suisan Tsushin, August 5.)

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EXPANSION OF TRAWL FISHERIES IN NORTH PACIFIC:

Japanese expect that there will be a great boom in the North Pacific trawl fisheries this year and next year, because of the increasing operations of fish-meal and frozen-flatfish fleets.

Japan (Contd.):

These fisheries, however, face increasingly serious problems with respect to bottom fish resources, administrative guidance, relations with other fisheries, and the economics of operation. Although at the present time the magnitude of the northern bottom fish resources is not clear, the authorities and the industry are setting up optimistic estimates, planning additional fleets, and considering the fisheries as a possible place in which to redeploy excess fishing power resulting from reorganization of the salmon fishery. At the same time, there are plans for sending out more fleets to produce frozen flatfish, as the popular market for this product grows. On the other hand, some elements in the industry doubt whether the bottom fish resources are capable of supporting 10 or more fleets.

There are already plans for sending six fleets to the Bering Sea and the Okhotsk Sea in September to produce frozen flatfish. This year there are two fish-meal fleets in operation, but it is expected that next year this number may increase to six, if the plans of the operating companies materialize. At this rate, the frozen flatfish operations will take 30,000 metric tons of fish, and each of the fish-meal fleets will use from 70,000 to nearly 100,000 tons of flatfish and Alaska pollock. The total catch of bottom fish, if all fleets operate as planned, will be over 500,000 metric tons.

Considering the fleet operations in detail, the 9,600-ton Kinyo Maru and the 11,000-ton Tenyo Maru are operating as fish-meal factoryships in the Bristol Bay area, each using 22 trawlers. Early in September the 9,800-ton Miyajima Maru, the 7,400-ton Kashima Maru, the 7,500-ton Criyo Maru, and the 10,000-ton Kyokusan Maru, each with a number of trawlers, sailed to the Bering Sea to produce frozen flatfish, while the 7,400-ton Itsukushima Maru and the 7,400-ton Eijin Maru departed for the Sea of Okhotsk for the same type of operation. The fish-meal factoryships sailed in April and the frozen flatfish fleets in September, and if the plans for increasing the number of fish-meal fleets materialize, the latter part of the fishing season next year may see more than 10 fleets on the north Pacific grounds.

The effect on the resources is not the only problem. There is also that of the physical capacity of the fishing grounds. On August 10 the Japanese authorities closed an area to fish-meal fleet operations because of possible effects on crab resources. This was an area on the east side of the fishing grounds around 57° N., 165° W., an area of good catches which is essential in order to make fish-meal fleet operations pay. The operating companies say that the value of their fishing grounds has been cut in half by this action. Not only have the grounds on the Bristol Bay side been shaved back because of the relation to the crab resources, but they are pinched on the north by the Soviet crab fleet, and to the west, on the Bering side, by the Soviet trawling fleet of 48 ships, so that it seems to be a question whether there is room for 10 or more fleets to operate. (Suisan Keizai Shimbun, August 16, 1959.)

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LANDINGS OF FISHERY PRODUCTS INCREASED IN 1958:

Japan's total landings of aquatic products (excluding whales) in 1958 amounted to about 5.5 million metric tons (about 12.1 billion pounds), as compared with 5.4 million tons (about 11.9 billion pounds) in 1957. The lower rate of increase of about 2 percent, as compared with an increase of 13 percent from 1956 to 1957, is an indication that the expansion of Japanese fisheries production may be reaching its limits. The average price to the producer for all aquatic products was down by 9 percent in 1958 from the preceding year.

Landings from general marine fisheries, fresh-water aquiculture, and whaling increased, while landings declined in fresh-water fisheries and marine aquiculture, the latter primarily because of the poor laver (edible seaweed) crop. Among the important species, skipjack tuna, saury or jack mackerel, and sand launce landings were up; albacore tuna, sardine, herring, and Atka mackerel catches dropped considerably.

Statistics compiled on the worldwide landings of tuna by Japanese boats in

Japan (Contd.):

1958 show a total of 416,246 metric tons for all species, of which 10,710 tons were produced by mothership fleets, and 43,946 tons were landed in foreign ports from Samoa to Haifa, Israel. Ex-vessel tuna prices were generally higher than in 1957: the average price of bluefin tuna was up 86 percent, to $567 a short ton, because of the short catch; yellowfin, at $234, was up 10 percent; and bigeyed, at $257, was up 7 percent, the United States Embassy in Tokyo, reported on July 7, 1959.

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A JAPANESE AND A UNITED STATES COMPANY PLAN TO CAN OYSTERS IN JAPAN:

In mid-August a Japanese fishing company entered into an agreement with a United States west coast oyster canning firm under a provisional contract for the production of canned oysters using Hiroshima oysters as raw material. The president of the United States company arrived in Japan on September 7 to work out the details of the plan.

According to the plan, a factory will be built in Hiroshima with capitalization of about 250 million yen (US$694,000). An engineer and an inspector will be sent from the United States. Canned oysters will be produced to meet United States pure food standards and the product will be exported to the United States oyster company. A trading firm of Nozaki is also involved in the agreement.

The cannery will pack small shrimp and fruits during the oyster off-season, and it is estimated that annual sales will amount to about 600 million yen (US$1.7 million). (Nikkan Suisan Tsushin, September 7, 1959.)

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INVESTIGATE FROZEN RAINBOW TROUT EXPORTS TO UNITED STATES:

Since last year the price of Japan's frozen trout exports to the United States has been steadily dropping because of overproduction and competition from Danish trout. Towards the end of August the price was down to 33 to 34 U. S. cents a pound c.i.f. United States west coast port.

It is reported that the U. S. Treasury Department has taken note of this situation and has instructed the United States Embassy to investigate to see whether or not there is any suspicion of dumping in connection with rainbow trout exports.

The August 1959 landed price for trout in Japan was about 500 yen per kan (8.27 pounds) or 17 U. S. cents a pound, but it went down to 400 yen (13 cents a pound) for a while, so the average is about 450 yen per kan or about 15 cents a pound. (Nikkan Suisan Tsushin, August 25, 1959.)

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COMPANY FORMED TO HANDLE FUR-SEAL AND OTHER MARINE-ANIMAL SKINS:

A Japanese company has been formed, capitalization 20 million yen (US$55,600) to handle marine-animal pelts or skins. The Company's first activity was expected to be a bid on 2,847 fur-seal skins offered at Osuchi on August 26.

The company will engage in general development of marine leathers; utilization of the hides of such salmon predators as salmon sharks, sea lions, and porpoises; improvement of tanning technology and export of products; and mink rearing in the colder parts of Hokkaido.

Up to the present time the Japanese Government has consigned its 15-percent share of seal skins taken under the North Pacific Fur Seal Treaty to a Saint Louis, Mo., Company, and has received the money from their sale. The new Japanese company will try to have these pelts sold in Japan, as a way of encouraging development of a new business. (Nikkan Suisan Tsushin, August 22, 1959.)

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SURVEY OF FISHERMEN'S LIVING STANDARDS:

The Fisheries Department of Kagawa Prefecture is trying to improve the living standards in fishing villages, which are lagging far behind those of farming villages. This spring the Department's newly-established Fishing Village Liveli-

Japan (Contd.):

hood Improvement Guidance Section carried out a survey of the actual living conditions of fishermen's families, with the cooperation of the women's auxiliaries of 15 fishery cooperative associations in the Prefecture.

Some of the major points revealed by the survey were as follows: The monthly average budget for the families in each cooperative ranged from a high of 22,000 yen (US$61.60) to a low of 8,000 yen (US$22.40), with four cooperatives reporting average budgets of less than 10,000 yen (US$28). The majority of the families reported that they could not live on their earnings from fishing alone, the difference being made up by farming, day labor, and borrowing.

On the question of whether they would encourage their children to take up fishing as a career, the cooperative with the highest percentage of affirmative answers reported only 40 percent, while all members of six cooperatives replied in the negative. (Nippon Suisan Shimbun, August 21, 1959.)

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TRADE AGREEMENT WITH ITALY INCLUDES TUNA:

Italy and Japan agreed sometime ago to conclude a new trade agreement, but it has been put off month after month. Recently, the Chief of the Trade Promotion Bureau, Italian Ministry of International Trade, was reported to be due in Japan and preliminary negotiations were expected to begin at the end of July.

Frozen tuna can only be exported to Italy in barter for Italian rice and unless Japan buys rice, tuna cannot be exported even though orders for frozen tuna are received from Italy. The Japanese tuna industry, therefore, has been making a strong representation urging speedy conclusion of a new trading agreement so as to make tuna exports more freely. With the prospect of the renewal of the Italian-Japanese trade agreement the Japanese tuna industry became more optimistic regarding future trading in frozen tuna. (Industrial News, July 25, 1959.)

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Republic of Korea

SHRIMP CATCHES IN DEEP-WATER DURING OFF-SEASON PROMISING:

A Korean fishing company reported good catches of shrimp in deep water off Pohang in July 1959. The vessel fishing for shrimp is operating under the guidance of Fisheries Research Station technicians. The catches made are significant because heretofore commercial shrimp fishing had not been carried out during the summer. It is considered an important development because attempts are being made to fish for shrimp off Korea year-round. (U. S. Operations Mission in Seoul, August 21, 1959.)

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TWO MODERN TRAWLERS ADDED TO FISHING FLEET:

Two 80-ton trawlers arrived in Korea from Japan at the end of June. The vessels are equipped for multiple-purpose fishing, are completely refrigerated, and are of modern Japanese design and workmanship. They were expected to start trawling for fish as soon as customs formalities had been completed. (U. S. Operations Mission in Seoul, August 21, 1959.)

Mexico

EXPORT DUTY CUT ON SHRIMP FROM SOME AREAS:

Effective August 30, 1959 (Diario Oficial, August 27, 1959) Mexico lowered the export duty on frozen shrimp originating from the Gulf of Mexico, Salina Cruz, Oaxaca, and Santa Rosalia, Baja California, by about 0.75 U. S. cents a pound. At the same time the export duty on fresh or iced shrimp of the same origin was lowered about 4.2 U. S. cents a pound. The change in duty was effected by decreasing the official price, upon which duties are calculated, from 1,700 pesos per 100 net kilograms to 1,250 pesos (from about 61.8 cents to 45.4 cents a pound). Duties for shrimp from other points in Mexico remain as previously (about 2.9 U. S. cents a pound for frozen and about 15.75 cents a pound for fresh or iced). Before the present reduction

Mexico (Contd.):

the export duties throughout Mexico were the same irrespective of the origin of the shrimp.

Practically all shrimp exported from Mexico are frozen. The present duty change will give producers in the Gulf of Mexico and Salina Cruz a slight relief from low production and falling prices in the United States market.

Frozen shrimp in 1958 ranked fourth in Mexican exports with a value of about 400 million pesos (about US$32 million). In 1959 Mexican shrimp exports through June were about 50 percent higher than during the same period in 1958. This ratio dropped during July and August owing to a closed season in the Pacific. (United States Embassy dispatch from Mexico, September 4, 1959.)

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NEW SHRIMP FREEZER AND FISH CANNERY:

A combined shrimp freezing plant and fish cannery is under construction at Santo Domingo, Baja California, Mexico. Freezing capacity will be 26,000 pounds daily with storage capacity for 600,000 pounds of frozen shrimp. The plant will also produce 50 tons of ice daily and have storage space for 500 tons.

In addition to freezing shrimp (the principal objective) and some fish, the plant will can tuna, sardines, and abalone. Completion date for the freezing section is scheduled for the end of November 1959, and January 1, 1960, for the cannery.

Santo Domingo is on the west coast of Baja California at approximately 25°30' latitude. It is situated in the lagoon area which connects with the northern end of Magdalena Bay.

During the past two seasons, the area along the west coast of Baja California between Scammons Lagoon and Cape San Lucas has been quite productive in shrimp. The freezing plant is being constructed to eliminate the costly transport of the catch to plants on the mainland or in Mexicali. (United States Embassy dispatch from Mexico, August 28, 1959.)

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SHRIMP FISHERY TRENDS, AUGUST 1959:

Shrimp production and exports by Mexico were down during August 1959 due to the closed season for shrimp trawling in the Gulf of California which began on July 16 and ended on September 15. Bay fishing in that area began on September 1, but catches were not expected to be higher than in 1958 because of the low price of small shrimp on the United States market.

Falling prices on the United States market during August caused considerable distress in the Salina Cruz fisheries. Prevailing prices paid on shrimp smaller than 25 to the pound were generally less than the cost of production. To alleviate the situation somewhat, the Government at the end of August reduced export duties on frozen shrimp by about ¾ of a U. S. cent a pound. This reduction only affected shrimp exports originating from the Gulf of Mexico, Salina Cruz, Oaxaca, and Santa Rosalia, Baja California.

At Ciudad del Carmen fishing improved a bit the latter part of August but still was averaging less than one ton of headless shrimp per 10- to 12-day trips. Catches at Campeche were somewhat less. Salina Cruz catches were reported to be a little better than those in the Gulf of Mexico.

Carmen landings were about two-thirds pink and one-third white shrimp with a smattering of browns. About 45 percent of the catch was 26 to 30 count and under.

Campeche landings were about 95 percent pink and 5 percent white with no browns reported. The sizes of the shrimp in the catches ran larger than at Carmen. About 65 percent were 26 to 30 count and under, states a dispatch (September 4, 1959) from the United States Embassy in Mexico.

Morocco

CAMPAIGN LAUNCHED TO INCREASE USE OF FISH AND FISH FLOUR:

The first real attempt to fulfill the hope that Morocco increase her consumption of fish was "Operation Poisson," a campaign launched by the Ministry of Health in two low-income neighborhoods in Rabat. The advantage of such an increase would be: (1) to absorb a part of Morocco's overproduction of sardines, and (2) to supplement the population's protein-deficient diet. Although concentrating on the sale of fresh sardines, the campaign also aimed at popularizing the use of a fish flour produced in Safi for human consumption. Much publicity has been given to the drive by the press. Permanent effects are difficult to estimate, and sales may fall off when the fanfare subsides, but the results of the campaign exceeded the expectations of the government.

The fish flour (Farine Alimentaire de Poisson--80 percent protein) is a whitish powder, slightly fish-flavored, made from dressed sardines. The process was developed by a chemist, who worked in cooperation with the Food and Agriculture Organization, which has since taken an active interest in the product and has sent experts from time to time to make tests. A pilot plant capable of producing a ton of fish flour a day went into production in August 1958, and the flour has since been used by the Government in orphanages and hospitals.

The importance of the product to Morocco (and to many other countries with protein-deficient diets) lies in its low price, its keeping quality, and its high protein content. It is not yet sold commercially except in pharmacies, but the factory-door price is only 192 francs a kilogram (about 20.7 U. S. cents a pound at rate of exchange 420 francs equal US$1). The normal supplementary protein needs of an adult in Morocco can be satisfied by 25 grams (about 0.9 ozs.) of fish flour a day, which costs about five francs or a little over 1 U.S. cent. Although the retail price would no doubt be considerably higher due to distribution and packing costs, the price is still extraordinarily low for a high-protein food. A kilogram (2.2 lbs.) of fish flour is said to be the equivalent of about seven kilograms (15.4 lbs.) of red meat.

The fish flour is presently packed in polyethylene bags and is said to keep very well. When mixed with spicy Moroccan foods, the fishy flavor of the product can be concealed to some extent. During the campaign, the flour was baked into a kind of Moroccan bread made with anise and ginger which reportedly had no fishy taste. (United States Consulate in Casablanca, September 8, 1959.)

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FISHERIES TRENDS, JULY 1959:

On June 10, after the first three days of fishing, the owners of the sardine fleet of Safi, Morocco, decided unanimously to keep their boats in port rather than yield to the demands that the fishing crews be chosen by the fishermen's union rather than by the boat-owner. On June 19, after Government intervention, the union conceded that the owners have the right to select their crews. Work was immediately resumed, and some boats went out on the day of the settlement.

During the first three days of fishing, 95 percent of the catch was sold to fish meal and oil plants and the rest frozen for export. The canneries, which used to buy most of the cannable sardines, had not yet opened. There remain about 700,000 cases of canned sardines from the 1958 season, which because of Morocco's failure to devalue her franc along with French franc will be hard to sell in France.

The devaluation crisis has also had the effect of completely stopping the export of shrimp to France. This product in 1958 brought in 400 million francs (about US$952,000). France has turned to less expensive suppliers including Italy, Egypt, and the Scandinavian countries.

France is expected to renew the customs free import quota for Moroccan sardines and admit up to 600,000 cases of canned sardines and 3,000 metric tons of frozen sardines. It is probable that without this advantage on the French market, the fish-canning industry in Morocco, already in dire straits, would col-

Morocco (Contd.):

lapse. There is great concern that France's obligations to the Common Market may prevent her from continuing to permit customs privileges to Morocco.

Moroccan fishing boats have been selling fish to French and Portuguese boats out at sea rather than landing their catches. The sale is illegal because it evades the landing tax. The price received is not known, but it presumably exceeds that expected in a Moroccan port where most fish are sold to byproducts plants.

Large French sardine boats continue to fish off the Moroccan coast but outside the six-mile limit. The fish are frozen aboard ship and taken back to France for canning. The Moroccan fisheries industry, thus bypassed, is eager to have Moroccan territorial waters extend out twelve miles, which is about the average extension of the continental shelf.

The fish meal and oil plants until now the only prospering segment of the fisheries industry, are finding themselves hard pressed and are rebelling at the relatively high price they must pay for their fish ($9\frac{3}{4}$ francs per kilogram or about US$21.00 per short ton--and 11 francs or about US$23.75 per short ton after July 31). The fish meal plants are not working in Agadir and fish are being caught there only for freezing and for a very small sardine canning activity.

The electrical fishing experiments which have gone on for over a year off the Moroccan coast have so far failed completely, the United States Embassy in Rabat reported on July 29, 1959.

Note: Moroccan francs converted to US$ at rate of 420 francs equal US$1.

Netherlands

UNDERWATER STUDIES OF TRAWLING:

Working with the Institute for Fishery Research at Ijmuiden, Dutch frogmen for the first time have observed the reaction of fish along the sea bed as they are caught in the nets of a trawler. The study was carried out on the sea bottom by four amateur frogmen, at a depth of between 50 and 60 feet, 12 miles northwest of Ijmuiden on the Dutch coast.

The most surprising result of the study, according to the Institute, was the discovery that about 20 percent of the fish caught escape through the meshes when the trawl is drawn up from the sea bed. The frogmen also reported that flatfish did not move until the trawl was only about six inches away and then swam upwards to try to keep ahead of the net. The fish usually gave up this effort after about 30 seconds.

Owing to the success of the tests and the amount of study material produced by them, plans are now being made to train frogmen for work exclusively with the Institute during which underwater cameras will be used. (United States Embassy, The Hague, June 25, 1959.)

Nicaragua

SHRIMP FISHERY TRENDS:

Shrimp fishing off the Caribbean coast of Nicaragua has been quiet since the beginning of 1959 and the Collector of Customs reported only 154,000 pounds exported during the first quarter of 1959. The Compania Maritima Mundial Sociedad Anonima of Nicaragua has been granted a 10-year concession to fish off the Atlantic coast and a United States company from Florida asked for a concession to fish off the same coast.

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SHRIMP LANDINGS AND EXPORTS:

Landings: Prior to 1958 shrimp fishing in Nicaraguan waters was done primarily to supply the domestic demand and few shrimp were exported. Since the Nicaraguan market is small (population 1,400,000), probably not more than 220,000 pounds of shrimp were caught each year from 1954 to 1957. In 1958 a law for the development of the country's natural resources was approved and foreign companies, primarily Panamanian

Nicaragua (Contd.):

and American, began fishing for shrimp off both coasts of Nicaragua by virtue of licenses granted by the Nicaraguan Office of Natural Resources (Oficina de Riquezas Naturales). The catch in 1958 was estimated by the Office of Natural Resources at 728,000 pounds of which almost 617,000 pounds were exported--includes both shrimp (90 percent) and lobster (10 percent). The catch in 1959 should exceed the 1958 catch.

Exports of Crustacea and Mollusks: Nicaragua's Customs Collector includes shrimp under crustacea and mollusks, code 031-03 of Nomenclature Arancelaria Uniforme Centroamericana, published by the United Nations in December 1955.

A total of 1,000 pounds, valued at US$746, of shellfish (mostly frozen shrimp) were exported to Costa Rica in 1954 and 1,300 pounds, valued at $700, were exported to the United States in the same year. There were no exports during 1955 and 1956.

A total of 1,200 pounds valued $575, were exported to Costa Rica in 1957 and 1,600 pounds, valued at $750, were exported to Panama in the same year.

A total of 6,000 pounds, valued at $3,600, were exported to Panama in 1958 and 603,000 pounds, valued at $315,721, were exported to the United States in the same year.

During January and February 1959, 101,000 pounds valued at $55,497, were exported to the United States. (United States Embassy, Managua, report of June 8, 1959.)

Norway

FISHERMEN'S MARKETING ORGANIZATION ENDS EX-VESSEL PRICE DISPUTE WITH FILLET INDUSTRY:

North Norway's fishermen's marketing organization (Norges Raafisklag) in July 1959 agreed to comply with the Norwegian Ministry of Prices and Wages directives calling for a reduction in the price spread between ex-vessel prices paid by the filleting and freezing industry (Norsk Frossenfisk) and other processors. The fishermen's organization also announced that it will honor the terms of an agreement with the filleting and freezing industry on summer fish prices. In turn, the filleting and freezing industry announced that it had withdrawn its breach of contract suit against the fishermen's marketing organization.

The long-standing dispute between the fishermen's marketing organization and the filleting and freezing industry over ex-vessel prices appears to have been settled, if not permanently, at least for the time being. (United States Embassy dispatch from Oslo dated July 31, 1959.)

Note: Also see Commercial Fisheries Review, June 1959, p. 73.

Pacific Islands Trust Territory

FISHERIES IN 1958:

The potential fishery resources of the Trust Territory of the Pacific Islands[1/] are substantial. Subistence fishing is an important daily activity for most of the inhabitants. Fish and other seafood provide the chief source of protein for the local diet. Fishing is carried out mainly on the reefs and in the lagoons; a limited amount of deep-sea fishing is done.

The potential of commercial fishing is recognized, and the Administering Authority for a number of years has been exploring ways and means of developing this important asset. A fisheries biologist was employed in 1958 to survey the fishery resources of the Territory and assess the fisheries potential and need of the various districts. Following the completion of this survey, it was determined that initial development efforts would be made in the Palau District. A subsistence fishing project was conducted during the year in that district and a small-scale commercial fishing project begun.

A substantial concrete dock, a steel shed, together with adequate adjacent land was obtained for the fisheries project and rehabilitation of the buildings started. The items of equipment necessary to the initial plant such as a freezing unit, ice plant, and the like have been purchased and are awaiting installation. The fisheries biologist made arrangements in Japan for the construction of a 20-ton fishing vessel, which will operate out of the Palau fisheries project headquarters. The delivery of this fishing vessel was scheduled for November 1958. The goal of the fisheries project is to cut down the Trust Territory's imports of canned fish in Palau and elsewhere in the area by instituting efficient

1/Under Trusteeship of the United States since July 18, 1947. Occupies a vast ocean area of some 3 million square miles in the Western Pacific north of the equator and consists of three major island groups--the Marshalls, the Carolines, and the Marianas. Administered by a High Commissioner under the supervision and direction of the U. S. Secretary of the Interior.

Pacific Islands Trust Territory (Contd.):

fishing and fish-preserving techniques, which could be operated by local industry. Plans called for the opening of a fish-processing plant for the preservation of fish by methods other than by canning to be in operation by mid-1959. Eventually it is hoped that an experimental small-scale pilot canning plant can be put into operation.

To a very limited degree, localized commercial fishing is being carried on presently in the Ponape and Palau Districts. In Ponape limited freezing facilities are available at the district center and local fishermen are able to sell their catch for local use and for export to the neighboring Marshall Islands and Truk Districts for use of administration, school, and hospital activities. In 1958 Ponape fishermen provided some 27,000 pounds of fish for this purpose. During the year fishermen of the Palau District shipped approximately 14,000 pounds of fish to Guam, which was double the amount shipped in the previous year. In addition, some 1,400 pounds of crabs were shipped to the Guam market. Lack of equipment, storage facilities, and uncertain markets have kept this localized commercial fishing on a small-scale basis. During the year a certain amount of localized commercial fishing was attempted at the Truk District Center. Saipan District exported some 4,000 pounds of fish to the Guam market during the year. In addition, sizable amounts are sold there in the local markets.

In 1958 a training and demonstration program in subsistence fishing was established in Palau. The two Micronesian fisheries trainees who had attended the South Pacific Commission Fisheries Training Course in 1957 and who later in that year worked with the Pacific Oceanic Fisheries Investigations of the U. S. Fish and Wildlife Service in Honolulu joined the staff of the fisheries biologist. Courses of instruction in net making and repair were given to the students of Palauan schools. The Subsistence Fisheries Project also constructed several different types of nets and tested them in Palau waters. Through the development of a program of subsistence fishing, the Administration hopes to enable the Micronesians to better utilize the valuable resources of the sea.

The marine biologist working in the Territory completed his contract during the year under review. The various programs that he originated during his 2½-year assignment will be carried on under the direction of the fisheries biologist. During 1958 the marine biologist, in addition to completing the trochus survey, conducted a special survey of many of the islands of the Marshall and Caroline Islands to determine their potential as trochus habitats in order that a subsequent trochus planting program could be organized. Various experiments were conducted in the Marine laboratory in Palau and in the field to determine optional methods whereby trochus could be transported to planting areas. Among such experiments was the introduction of trochus into remote reefs through experimental airdrops by Trust Territory aircraft.

A handbook of practical trochus management instruction written in simple English for Micronesians was also prepared by the marine biologist. This handbook Trochus and You is illustrated and was designed so that it can be easily translated into the various languages of the Territory.

Experimental work in other fields of fishery work continued during the year.

Species of tilapia, first introduced from the Philippines to Guam and thence to the Trust Territory, appears to have been successfully acclimated to fresh-water pond conditions in the Territory. In the Saipan District, tilapia of mature size are now being caught by hook and line in lakes and ponds on Saipan, Tinian, Anatahan, and Pagan. In Ponape District tilapia have been successfully raised at the agricultural station and are being distributed to local people.

The experimental work on sea turtle culture that started during 1957 has continued. Sea turtles provide a source of food, and certain species also provide shell which is in demand for use as a local handicraft item. Experimental raising of young turtles under controlled conditions is being carried out in Ponape District and some planting of marked young turtles in outlying areas was made. (Eleventh Annual Report to the United Nations on the Administration of the Trust Territory of the Pacific Islands, July 1, 1957 to June 30, 1958.)

Panama

SHRIMP INDUSTRY:

The shrimp export business of Panama accounts for about 27 percent and ranks second to bananas in total exports. In 1958 the value of shrimp exports fell below that of 1957.

Shrimp samples being measured. On the advice of FAO fishery expert, the Government of Panama has set up a marine fishery research station where studies on the shrimp population of Panama are being carried out.

In July 1959 the Government of Panama established regulations for fishing and the export of fishery products. Both the Government and the shrimp industry (valued at about US$8.5 million)

Panama (Contd.):

have re-examined policies and practices in the hope of assuring the continued development of the shrimp resource as a profitable enterprise. During the first seven months of 1959 catches of white shrimp continued spotty, but were better than during the similar period of 1958.

All Panamanian shrimp trawlers were fishing in Panama waters during the first seven months of this year. Due to the drop in shrimp prices in the United States market, however, prices paid the shrimp vessel owners and crews have been cut. One of the largest shrimp processing companies has installed a mechanical shrimp peeler and has also absorbed several smaller plants. The drop in shrimp prices has caused some distress to various segments of the shrimp industry. (United States Embassy dispatch from Panama, August 31, 1959.)

Poland

FISHERY LANDINGS, 1958:

Poland's fishery production during 1958 totaled 126,000 metric tons. The most important fishery product was herring caught in the North Sea which amounted to 55,000 tons. The second most important product was hake from the Baltic Sea which consisted of about 40,000 tons.

Of the total fishery landings, 95,000 tons were landed by the Government-owned fishing fleet, 16,000 tons by cooperatives, and the remaining 15,000 tons by individual fishermen.

The Polish Institute of Marine Fishery at Gdynia announced that during 1958, 22,000 persons were employed by the fishing industry and related industries. Of the total, 6,000 were actually employed as fishermen and the other 16,000 were employed on land in processing and canning plants. (Industrias Pesqueras, Special Issue, Vigo Spain, May 15, 1959.)

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HERRING CUTTERS OPEN BASE IN BRITAIN:

The Polish herring fisheries have opened a shore base on Britain's northeast coast, at Sunderland, for the use of their cutter flotilla. This is part of Poland's new fish landing method known as "expeditionary fishing," by which the fleet fishing on the North Sea grounds is relieved at sea of barrels of salted herring for shipment home by base ships.

A number of British firms have been asked by Polish fishery promoters for offers to organize shore bases at one or more British east coast ports, mainly to accommodate 79-foot cutters.

The Sunderland base consists of a 650-foot quay, two warehouses with a total storage capacity for 8,000 barrels of salted herring. Another 12,000 empty barrels--or with salt--can be stored at the quay outside the warehouse; also short-term warehousing is possible for about 50,000 barrels of herring, including the services of local dockers.

It is estimated that the Sunderland base will handle about 50,000 barrels of salted herring to be re-forwarded to Poland by the end of this year.

Poland's fishing industry estimates that their landings of salt-water fish from the North Sea this year will reach about 146,000 metric tons, of which 61,000 tons will be herring.

Polish Maritime News says: "These herring catches are not high in comparison with those achieved by British, Dutch, or West German fishing fleets. This is because Polish ports are situated far from the fishing grounds, a serious disadvantage as our proportionately small fleet has to undertake long, unproductive sailing time from 3 to 5 days each way."

It explains that under the "expeditionary fishing" method the base ships also supply the fleet with provisions, fresh water, fishing equipment, empty barrels, and salt.

Taking advantage of the services by base-ships, the time which would otherwise be taken by unproductive sailing can be used for operations on the fishing grounds.

The "expeditionary fishing" in the North Sea usually lasts from the beginning of May till the beginning of December. Up to the end of June, due to the services given by a mothership and three auxiliary vessels, the herring catches in the North Sea amounted to over 16,000 tons, the paper claims. The fishing in the area for this year is for 61,000 tons of herring, the highest catches falling into the third quarter. (The Fishing News, August 28, 1959.)

Portugal

ALUMINUM DORIES TESTED IN GRAND BANKS FISHERY:

A newly-designed aluminum fishing dory or boat may replace the traditional wooden dory and change the fishing methods on vessels of the Portuguese line-trawl fleet operating in northwest Atlantic waters.

Portugal (Contd.):

The new boats are being fished experimentally by the 600-ton modern dory vessel, the Lousado. This vessel fished during the spring of 1959 on the Grand Banks and fished off Greenland during the summer.

The 75 dories which the Lousado was designed to carry were replaced this year by ten 21-foot aluminum boats, built in Bergen, Norway. Each of the new boats is powered by an 8-hp. Swedish Diesel engine and a variable-pitch propellor. They are capable of speeds up to 6½ knots. Airtight compartments along the boat's side and at the stern give the small craft added buoyancy and safety. The boat weighs about 1,800 pounds and has a capacity for about 2,000 pounds of fish. Each is equipped with compass and oil lanterns and can fish at night if necessary.

Each boat carries two fishermen who use three metal tubs of 15 lines each, for a total length of approximately 2½ miles. The baited line is paid out over the stern along a specially-designed chute. It is brought back over a removable roller on the side by means of a mechanical gurdy.

One of the remarkable features of the new boat is the method of handling fish. Once the fish is aboard it is kept cool and clean by means of a constant flow of sea water which is mechanically pumped in and out of the boat. A hand pump is provided for use in the event of a breakdown. Unloading the fish is another mechanical operation. The bottom of the boat is covered with a small mesh net which enables a hydraulic hoist to unload the catch in a single lift. The catch is unloaded after the boat is lifted aboard the Lousado. These boats can be launched in approximately two minutes and hoisted back, with a full load, in about three minutes.

The Lousado is the only Portuguese vessel engaged in this particular type of experimental fishing at the moment. Four trial runs have been completed and the operations of the new boats have caused the master of the Lousado to predict that the new-type fishing boat will prove successful. The advantages are obvious ones, but principally they are those of safety and less arduous toil for the fishermen plus increased efficiency in both fishing methods and handling.

The results of this experimental fishing will be watched closely by the Portuguese fishing industry, but not more so than by the fishermen themselves, who see in the new boats a welcome change from the century-old dory operations. (Trade News, July 1959, Canadian Department of Fisheries.)

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CANNED FISH EXPORTS, JANUARY-MAY 1959:

Portugal's exports of canned fish during January-May 1959 amounted to 28,781 metric tons (1,587,000 cases), valued at US$14.6 million as compared with 32,868 tons, valued at US$17.1 million for the same period in 1958. Sardines in olive oil exported during the first five months of 1959 amounted to 21,247 tons, valued at US$10.4 million.

During January-May 1959 the leading canned fish buyer was Germany with 6,569 tons (valued at US$3.3 million), followed by Italy with 3,560 tons (valued at US$1.9 million), Great Britain with 2,592 tons (valued at US$1.2 million), United States with 2,531 tons (valued at US$1.8 million), and Belgium-Luxembourg with 2,161 tons (valued at US$1.1 million). Exports to the United States included 1,266 tons of anchovies, 52 tons of tuna, 1,156 tons of sardines, and 20 tons of mackerel. (Conservas de Peixe, July 1959.)

Portuguese Canned Fish Exports, January-May 1959

Species	January-May 1959	
	Metric Tons	US$ 1,000
Sardines in olive oil	21,247	10,363
Sardine & sardinelike fish in brine	865	174
Tuna & tunalike fish in olive oil	898	642
Anchovy fillets	2,845	1,997
Mackerel in olive oil	1,823	901
Other fish	1,103	564
Total	28,781	14,641

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CANNED FISH PACK, JANUARY-MAY 1959:

The total pack of canned fish for January-May 1959 amounted to 7,905 metric

Portugal (Contd.):

tons as compared with 8,797 tons for the same period in 1958. Canned sardines in oil (3,407 tons) accounted for 43.1 percent of the January-May 1959 total pack, down by 32.7 percent from the pack of 5,066 tons for the same period of 1958, the July 1959 Conservas de Peixe reports.

Portuguese Canned Fish Pack, January-May 1959

Product	Net Weight	Cases
	Metric Tons	1,000
In Olive Oil:		
Sardines	3,407	179
Sardinelike fish	7	-
Anchovy	2,800	279
Tuna	1,145	41
Mackerel	70	3
Other species	476	24
Total	7,905	526

Note: Values unavailable.

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FISHERIES TRENDS, JANUARY-MAY 1959:

Sardine Fishing: During January-May 1959, the Portuguese fishing fleet landed 10,808 metric tons of sardines (valued at US$1,077,638 ex-vessel or about $99.71 a ton).

May 1959 landings of sardines totaled 5,030 tons, valued at US$522,819. Canneries purchased 25.2 percent or 1,267 tons of the sardines (valued at US$135,305 ex-vessel or about $106.79 a ton) during May 1959. The balance of 3,763 tons was purchased for the fresh fish market. None was salted.

Other Fishing: The January-May 1959 landings of fish other than sardines were principally 9,189 tons of chinchards (value US$519,619). (Conservas de Peixe, July 1959.)

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SARDINE PRODUCTION, 1958:

Sardines continued to be Portugal's leading commercial fish species during 1958. Fishermen (members of the Sardine Fishermen's Guild) landed 202,729 metric tons of sardines valued at about 440 million escudos (US$15.3 million). The 1958 sardine landings surpassed by 19,000 tons the best catch ever recorded previously, which was in 1941. Also, the record 1958 sardine landings were 53,000 tons greater than the average yearly amount landed during the 17-year period 1941-57.

Prices for sardines were lower in 1958 due to less demand on the part of the sardine canning industry which had accumulated stocks of canned sardines that could not be sold in 1957.

Portugal's total fishery production in 1958 attained a record high--11,000 tons higher than in 1957 which was the previous record high year. (Boletin de Informacion, Sindicato Nacional de la Pesca, Madrid, Spain, June 1959.)

Somalia

TUNA FISHERY, 1958:

There are two tuna canneries located at Candala and Abo on the Gulf of Aden in Somalia. Most of the tuna are caught by Somali commercial fishermen in the Gulf of Aden.

The estimated catch of tuna in Somalia in 1958 was about 10.7 million pounds. All types of fish and shellfish landed in Somalia amount to about 11.8 million pounds, therefore, tuna is by far the predominant species. The types of tuna caught were not reported. Besides tuna, 1 million pounds of shark were landed, and the balance consisted of blackfish, needlefish, sailfish, red snapper, spiny lobster, perch, and squid.

Fishery exports by Somalia in 1958 totaled 1.2 million pounds--mostly canned tuna and dried and salted fish (mostly tuna) shipped to Italy. But since most of the fishing is done in the Gulf of Aden, fishing vessels land some catches direct in Aden which are not reported as Somalia landings or exports. The value of Somalia's fishery exports is about US$667,000, or 5 percent of Somalia's total exports, the United States Consul in Mogadiscio reported on August 18, 1959.

Surinam

PRODUCTION AND EXPORTS OF PROCESSED SHRIMP, 1952-58:

Shrimp production in Surinam varied from a low of 300 metric tons in 1952 to a high of 927 tons in 1958. Prior to 1956, the catch was limited to a small estuarial variety of sea bob, which was dried and used largely for local consumption.

Table 1 - Surinam's Processed Shrimp Production, 1952-1958

Year	Dried Sea Bob	Frozen Pink Shrimp	Total
	(Metric Tons)		
1958	893	34	927
1957	353	12	365
1956	730	6	736
1955	560	-	560
1954	450	-	450
1953	400	-	400
1952	300	-	300

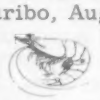
In 1955 a shrimp processing and freezing firm was established at Paramaribo with exclusive shrimp fishing and exporting rights. With the discovery of stocks of large pink and white shrimp off the Guiana coast, the Surinam shrimp company has concentrated on processing the larger shrimp for export.

Table 2 - Surinam's Exports of Shrimp, 1952-1958

Year	Quantity	Value	
	Metric Tons	Sf 1,000	US$1,000
1958	59	154	82.9
1957	22	72	39.0
1956	47	136	72.8
1955	12	26	13.9
1954	7	12	6.4
1953	10	14	7.5
1952	1/	1/	-

1/Less than 1 ton an Sf 1,000.
Note: Suriman florin equals US$0.535.

The Surinam Fisheries Service continues to dry sea bob, some of which are exported to the Netherlands, Curacao, Puerto Rico, and other Caribbean islands. No shrimp is imported into Surinam. (United States Consulate report from Paramaribo, August 7, 1959.)



U.S.S.R.

DEVELOPMENT OF A TUNA FISHING INDUSTRY:

The development of a commercial tuna fishery for the U. S. S. R. is discussed by A. V. Mikheev, a member of the Fisheries Division of the U. S. S. R. State Planning Authority, in the June 1959, issue of the Soviet fisheries periodical Rybnoe Khoziaistvo. The article is titled: "For a More Rapid Development of Tuna Fishing."

The article points out that in order to create the broad range of fishery products called for by the present U. S. S. R. 7-year plan, commercial exploitation of such species as tuna, sardines, and saury or mackerel pike must be developed as soon as possible. The author points out that sardine fishing by Soviet vessels in the tropical Atlantic and saury fishing in the Pacific are already on a commercial basis, but that much work remains to be done on tuna fishing, where experience so far has been on a small scale.

The present 7-year plan calls for an annual tuna catch of 200,000 centners (22.0 million pounds) by 1965. To attain this production, it is planned to build a number of specialized tuna boats to be based in the Far East for year-round tuna fishing in the Pacific, and a larger number of combination tuna boat-trawlers to be based in Baltic and Black Sea ports for seasonal tuna fishing in the tropical Atlantic.

The writer considers the various methods used for fishing tuna, and concludes that the U. S. S. R. fishing industry should concentrate first on the development of long-lining and seining, as techniques in which Soviet fishermen are more experienced. Pole-and-line fishing, because of the specialized skill which it requires and because of the difficulties associated with the use of live-bait, should be left for development at a later stage.

The article indicates that large-scale programs of exploratory and experimental fishing have been set up this year by the Kaliningrad Sovnarkhoz for the tropical Atlantic and by the Primorsk Sovnarkhoz for the Pacific.

The article indicates that the Soviet attempts to develop a tuna fishery have been attended by many difficulties so far, and states that the attempt to start off using the most complex types of tuna fishing mehtods and those least suited to Soviet conditions has had negative results and has

U. S. S. R. (Contd.):

delayed the development of the fishery. The author also stresses the need for making available materials for fishing gear, as well as building tuna boats, and states that at the present time it is difficult even to get together enough gear to equip a few exploratory fishing boats.

* * * * *

FISHERY PRODUCTION AND PROCESSING POTENTIAL BEING EXPANDED:

The Soviet Union is expanding to a considerable extent its fishery production and processing potential. Both the east and the west areas in which the fish are landed are located at great distances from the large consumption centers. Preservation on a large scale is a necessity and distribution of fish in the fresh state is almost excluded.

The difficulties have primarily been mastered through an appreciable expansion of the freezing capacity. Freezing capacity out at sea is larger than that on shore.

Russia has long experience with floating freezing factories. In 1880 they installed freezing machines on barges which were towed along the Volga from Astrakhan up that river. In a similar way, they started to utilize the fish of the river Yenisei in 1904. But present day Russia does not freeze fish only in its own waters. Through its modern freezing fleet, consisting of more than 300 units, of which some have a freezing capacity of 50 tons per 24 hours, it has become feasible to extend operations to distant waters far from their own coast.

In freezing units, designed by their own scientists and engineers, fish is frozen in slabs or blocks. Very little of the present fish catch is frozen and retail packed. After having brought the slabs to port, they are transported frozen, chiefly in railway cars, to fish-processing plants, frequently located in the areas of consumption.

Frozen fish is then defrosted and constitutes the basis for continuous packing operations in the canning plants. Some of the fish is smoked, and no small quantities are used after defrosting for the preparation of ready-made dishes. Fried fish fillets and boiled fish in plastic bags are a couple of the major bulk items. They are currently manufactured in continuously-operating production lines. In one of the large fish combines in Moscow, each processing line had a capacity of 10 to 20 metric tons per 24 hours.

In the North Pacific naval skirmishes between the Soviet Union and Japan were frequent in the 1930's. The real reason was the struggle for fish. Russia had built floating factories which could be towed to various areas around the sea of Okhotsk. Japan, on the other hand, manoeuvred out to sea and caught the salmon before it reached the Russian rivers for spawning. The Soviet Union, since World War II restricted Japanese fishing by allowing Japan to operate only one single floating cannery in that region.

Each Russian mothership is accompanied by 50 to 60 fishing boats. These floating factories chiefly can packs of various salmon and crab, at present an important export item. In the waters around Newfoundland, Soviet Russia is further operating regularly four floating salting factories. Even these are central units which serve a great number of fishing boats.

In spite of their extensive endeavors to acquire fish for food purposes, the Soviet Union has not met its needs. The investments made are, however, so sizable that their production capacity most likely will allow an appreciable increase in the annual production of fish for a number of years. The present 7-year plan is said to anticipate a freezing capacity of approximately 9,000 metric tons (19.8 million pounds) per 24 hours--i.e. three million metric tons (6.6 billion pounds) per year, of which almost one million (2.2 billion pounds) would originate on these mobile freezing units at sea. At present Soviet Russia is supplementing its own catch by buying fish on the world market. Significant quantities are obtained from Norway, England, etc.

Traditional canning has also enjoyed very active support. Several hundred

U. S. S. R. (Contd.):

plants have been erected within the frame of the terminated 5-year plans. In the first place they have been located in the large landing ports, but quite a number of these factories have been established in places with a flourishing inland fishery. Particularly interesting are those plants located in different sections of the large Siberian rivers and their tributaries. Fish-processing units (fish combines) are being built close to or inside large cities such as Moscow and operate in the way indicated above. It is noteworthy that even in the area of canning a penetrating, aimful research program is carried on. This has resulted in a remarkably rich diversification of canned fish products--stews or simply-cooked products. Besides the traditional fish varieties as salmon, tuna, etc., a number of other fish are put up in cans, such as cod, pike, bream, etc. The total pack of canned fish exceeds far what Canada, France, and Norway together pack. The number of canning plants is given as surpassing 190.

Quite another way to meet the fish requirements of this vast country is through the cultivation of fish in order to compensate for the declining yields of the natural waters. This has carried the Soviet Union to a leading position among the fish cultivating nations. Even if they in no way can compete with China, located in a much more favorable climate and having approximately 30 million hectares (74 million acres) of fish ponds, according to the latest information, the Russian accomplishments, nevertheless, are impressive. They now have 40,000 hectares of special fish-producing establishments and furthermore, half a million hectares of fish ponds and other waters on their sovchozes (state farms) and kolchozes (collective farms). The goal is to give each village at least one fish pond and to raise equally as much fish in this semiartificial way as in all internal waters of the Union, including the Caspian, Sea of Azow, etc. Without prejudices they have tested the most diverse fish varieties as to their productivity and reproduction. They also succeeded in mastering many difficulties in the raising of several fish varieties which earlier were not utilized for this purpose. Consequently, they do not only cultivate carp and certain salmon fishes, but also pike, large-mouth bass, and white fish are encountered in the ponds. For an efficient productivity, the simultaneous cultivation of two different species and varying ages is practiced. To the Fish Combine in Moscow is delivered young sturgeon, half-size, from fish ponds. They come raised in a type of "broiler" production of fish. They arrive at the plant in a living condition being brought in by specially-constructed refrigerated railway cars. These sturgeon are used in the manufacturing of ready-made dishes, and cooked fish cutlets in plastic bags.

Carp is, however, the dominating crop. No less than 113,200 metric tons (249 million pounds) was raised of this single species in 1957. The average yield was 825 pounds per hectare (2.471 acres). Methods and special strains of carp have been developed which allow profitable production even at the 60th latitude north, corresponding to southern Alaska.

At the large Industrial Exhibition in Moscow could be seen this year, not only a special railway car for the transporting live fish, but there were also given detailed descriptions of various types of fish-raising ponds developed by Soviet research workers and fish technologists. There is also experimentation with transplantations. The fishes of the lake of Bajkal and of Balkash are taken to the waters in the west and conversely the fishes of the European part of Russia are tested in the east. Special mention should be made of the large-scale efforts to acclimatize fish in the lower stretches of the rivers Don and Kuban, running into the Sea of Azow. Various salmon are transplanted and bred in the Baltic and Barrents Sea. Sturgeon breeding is going on in the Caspian. They have also been successful in the crossing of several fish species--in some cases even when they were distantly related. The Government is operating more than 130 hatcheries. Approximately 2,000 billion larvae and 5,000 billion young fish are released annually.

If one compares fisheries with agriculture, it is quite evident that proportionately larger resources are put to the disposal of fisheries in the Soviet Union. This indicates that in the long run they show greater confidence in fisheries than

U. S. S. R. (Contd.):

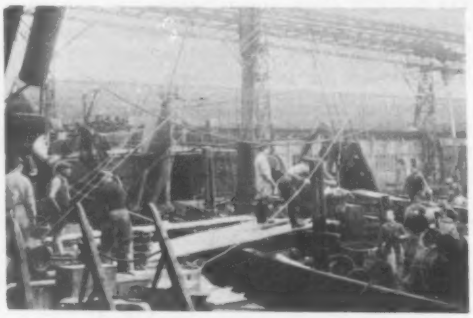
in agriculture when it comes to providing food for the rapidly-growing population and particularly animal protein. (World Fishing, May 1959.)

Note: 1 hectare equals 2.471 acres.

United Kingdom

DISTANT-WATER TRAWLERS MAY REQUEST SUBSIDIES:

During July a member of the United Kingdom Parliament suggested the possibility of a request for subsidies for the distant-water trawling fleet. He said that the fleet at Hull was faced with many problems, including obsolete slip-



Unloading distant-water trawler at Grimsby, England. Note movable winch on dock and gangplanks on which baskets of fish slide to dock.

ways, the problem of replacement, and competition. There was the supreme problem of the 12-mile limit and the threat voiced to bring out the limit to 100 fathoms. These "limits" problems and the cost of replacement might lead the distant-water fleet to ask the Minister for subsidies in the future. (The Fishing News, July 24, 1959.)

* * * * *

HERRING FISHERMEN PROTEST PRICE DROP:

The Scottish herring fishing fleets based at Peterhead and Fraserburgh were due to tie up about August 22 if the Herring Industries Board (HIB) implemented a decision to reduce the price of herring consigned to the meal and oil plants from 40/0 to 33/0 per cran (about 2.0 to 1.7 U. S. cents a pound). The price reduction, effective August 17, was announced when minimum prices were fixed for the season. But, claim the fishermen, the lower price in the circumstances of the present season will make fishing uneconomic. (Fish Trades Gazette, August 22, 1959.)

* * * * *

NEW FACTORYSHIP-TRAWLER COMPLETES MAIDEN TRIP:

The new factory-ship-trawler Fairtry II returned to Grimsby, England, late in July from its maiden voyage. The vessel landed 600 metric tons of fillets and whole fish, 202 tons of fish meal, and 3,600 imperial gallons of fish oil from a trip that started on April 2, 1959. Before the Fairtry II returns to sea for its second voyage, she will undergo minor modifications. The Fairtry II is a sister ship to Fairtry I which pioneered in England a new type fishing vessel that combined fishing and processing in the same hull. (The Fishing News, July 24, 1959.)

FEDERAL ACTIONS

Federal Trade Commission

MARYLAND CLAM DIGGERS' ASSOCIATIONS CHARGED WITH PRICE FIXING:

Three Maryland clam diggers' associations and their officers and members were charged by the Federal Trade Commission, in a complaint dated September 13 (7578, clams), with illegally fixing and enforcing prices of clams harvested in Chesapeake Bay.

The three associations include substantially all clam diggers operating in the Bay area. All members were not specifically named as party respondents because large and fluctuating membership makes this impracticable, the complaint says.

It charges that since 1958 the associations and their members have conspired "to suppress and hinder competition between and among themselves and also between themselves and other parties in the purchase or sale" of soft-shell clams.

Specifically, it alleges that they have (1) established and maintained uniform and noncompetitive prices and terms for the purchase or sale of their clams; (2) boycotted dealers seeking to buy clams at less than the fixed prices; and (3) enforced adherence to their prices and terms by various methods including threats of reprisals, intimidation, and physical violence.

Respondents were granted 30 days to file answer to the complaint.

* * * * *

TWO FISHERY FIRMS DENY ILLEGAL BROKERAGE PAYMENTS:

Two Seattle fishery firms (packers of canned salmon and other seafood) and their president and sales manager, on September 3, 1959, denied Federal Trade Commission charges of making illegal brokerage payments to favored customers (Answer 7562, Seafood).

The concerns admit selling their seafood pack to buyers throughout the country. However, they deny allegations in the Commission's August 6 complaint that they sell through primary brokers in the Seattle area and through field brokers elsewhere and that usually the former are paid a 5-percent brokerage fee and the latter a 2½-percent fee.

Requesting dismissal of the complaint, they flatly deny the charge that certain customers were given grants or allowances in lieu of brokerage or price-concessions reflecting brokerage, in violation of Sec. 2(c) of the amended Clayton Act.

The Commission's complaint (7562, Seafood), of August 24 charged that the concerns sell their products through primary brokers in the Seattle area and through field brokers elsewhere in the United States.

A typical method allegedly used was to give these customers or their agents price reductions which were coupled with or offset wholly or partly by reducing the broker's fee earned on the sales.

Department of Health, Education, and Welfare

FOOD AND DRUG ADMINISTRATION

PETITION FILED FOR USE OF AN ANTIBIOTIC TO RETARD SPOILAGE OF FISH STEAKS, FILLETS, AND PEELED SHRIMP:

A petition has been filed by American Cyanamid Company, Princeton, N. J., proposing the issuance of a regulation to

establish a tolerance of 5.0 parts per million (0.0005 percent) of the antibiotic chlortetracycline hydrochloride to retard bacterial spoilage in cuts of fish, such as steaks and fillets, and in peeled shrimp. The notice of filing of petition as published by the U. S. Food and Drug Administration in the September 11 Federal Register follows:

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Food and Drug Administration

[21 CFR Part 121]

FOOD ADDITIVES

Notice of Filing of Petition for Issuance of Regulation Establishing Tolerance for Chlortetracycline Hyrochloride for Use in Various Cuts of Fish and in Peeled Shrimp

Pursuant to the provisions of the Federal Food, Drug, and Cosmetic Act (sec. 409(b)(5), 72 Stat. 1786; 21 U.S.C. 348(b)(5)), the following notice is issued:

A petition has been filed by American Cyanamid Company, P.O. Box 383, Princeton, New Jersey, proposing the issuance of a regulation to establish a tolerance of 5.0 parts per million (0.0005 percent) of chlortetracyline hydrochloride to retard bacterial spoilage in cuts of fish, such as steaks and fillets, and in peeled shrimp.

Dated: September 8, 1959.

[SEAL] JOHN L. HARVEY,
Deputy Commissioner of Food and Drugs.

The use of chlorotetracycline on fresh-caught whole, headed, and gutted fish, shucked scallops, and unpeeled shrimp was authorized on April 21, 1959, by the Food and Drug Administration, and it was also in response to a petition by American Cyanamid Company. But cuts of fish steaks and fillets and peeled shrimp were not included in that authization.

Department of the Interior

ALASKA URGED TO HELP PROTECT SEA OTTER:

The Department of the Interior announced August 26 its legal determination that it does not now have authority to withdraw tidal and submerged lands as an addition to the Aleutian Islands National Wildlife Refuge in Alaska. Simultaneously, the Department asked that the State of Alaska take steps to join with the Federal Government to provide complete protection for sea otters in waters adjacent to the Refuge.

Secretary Fred A. Seaton said the ruling was made in view of the extension to Alaska by the Statehood Act of provisions of the Submerged Lands Act of 1953, vesting title in the States to tidal and submerged lands within three geographical miles of their coastline.

In his letter to Governor of Alaska William A. Egan, Secretary Seaton said:

> "Our biologists have made studies of the behavior of these sea otters. These studies and any other information we have on this subject will be made available to the Alaska Department of Fish and Game on request. And I assure you that we will be willing to discuss any arrangement which will lead to a cooperative management and protection program for sea otter.
>
> "My only plea is that you consider the matter as soon as possible. I am informed that these animals constitute a resource which could, once again, prove a valuable resource with commercial possibilities if properly managed. And I feel certain that it is not only in the national interest, but also the Alaskan interest, to see that the necessary steps for such protection are taken as soon as possible."

The Department's Bureau of Sport Fisheries and Wildlife applied in October 1958 for the withdrawal

Fig. 1 - Three adult sea otters and a pup on rocks, Amchitka Is.

of "all tidelands and all adjoining areas of water extending 3 miles beyond mean low water" adjacent to the Aleutian Refuge. This application was still pending when Alaska was admitted to the Union on January 3, 1959.

The purpose of this proposed withdrawal of tidelands and submerged land was to aid the Bureau in the protection and management of the expanding sea otter population inhabiting the coastal waters of the Aleutian Refuge.

A legal opinion by the Solicitor's Office advised the Secretary that the temporary segregation of these lands under this application did not under all the prevailing circumstances transfer the areas from the jurisdiction of the Bureau of Land Management to the Bureau of Sport Fisheries and Wildlife.

The withdrawal may not now be made, the ruling declared, since the lands are within the areas to which the Submerged Lands Act applies, and the title to those lands has passed to the State of Alaska.

Secretary Seaton expressed the hope that Alaska will promptly take the necessary steps to protect this valuable natural resource with its potential commercial possibilities, whether such steps involve State action only or a cooperative State-Federal approach.

Sea otters once were numbered in the tens of thousands in Alaskan and North Pacific waters. During the Russian occupation of Alaska, they were the object of intense hunting because a silky black sea otter pelt was worth its weight in gold. (In 1804 a single shipment of 15,000 skins valued at more than $1 million was made from Sitka, Alaska.) At the time the United States acquired Alaska in 1867, these valuable fur-bearing animals had been reduced to the point of commercial extinction by heavy exploitation.

Since 1910 the killing of sea otters has been outlawed, except for limited hunting by Alaska natives beyond the 3-mile limit. Sea otter protection by the Federal Government for nearly 50 years has paid off to the extent that about 30,000 of these sea mammals are now reported to live along the Alaskan and Aleutian Islands coast. A census of the animals in the Aleutian Islands area in May 1959 revealed a population of between 8,000 and 9,000--a very substantial increase over five years ago.

In studies carried on by the Bureau of Sport Fisheries and Wildlife, biologists have found that sea otters cannot live except along certain shorelines, in an area where the water is comparatively shallow, and where sea urchins--their principal food--are found. Kelp beds, where they may rest, play, and hide from killer whales, are also essential to their existence.

Bureau officials are greatly encouraged over the fine increase shown by the sea otters. However, because the animals spend most of their time offshore, they feel it is vitally important to be able to give them protection in the tidal areas.

The Aleutian Islands National Wildlife Refuge was established by Executive order in 1913. The 2,720,235-acre refuge extends throughout most of the island chain. It provides habitat for Emperor geese, ducks, sea birds, ptarmigans, brown bear, and caribou in addition to sea otters.

* * * * *

FISH AND WILDLIFE SERVICE

Bureau of Sport Fisheries and Wildlife

INTERSTATE TRANSPORTATION OF UNLAWFULLY-CAUGHT LIVE FISH PROHIBITED:

Federal and state fish and wildlife agencies now have been armed with stronger enforcement weapons to combat interstate transportation of illegally-caught game fish, the U. S. Department of the Interior reported September 15, 1959.

Steps are now being taken to use the new authority provided by a recent amendment to the "Black Bass Act." The amendment was approved by President Eisenhower on August 25, and became effective immediately.

Officials of the Bureau of Sport Fisheries and Wildlife, declare that it gives them the legal authority to halt a practice which is creating serious problems for state conservation agencies.

Federal and state conservation officials supported the amendment because of the growing practice by some groups of fishermen to net game fish unlawfully in one state, and sell them to fee-pond operators in another state. The new law, which not only covers the transporting but also the buying, selling, and possessing of unlawfully-caught live fish, gives the Federal Government authority to cooperate with the respective states in protecting their fisheries resources.

The Black Bass Act was passed in 1926 to halt interstate commercialization of a popular sport fish. Later it was extended to include all fish, except steelhead trout caught in the Columbia River between the States of Oregon and Washington. In those days the farm pond, and especially the fee pond, did not create an appreciable market for live game fish; thus, provision was not made in the original Act to include live fish or eggs.

Interstate Commerce Commission

RAILWAY EXPRESS AGENCY PERMITTED TO INCREASE LCL RATES:

The Interstate Commerce Commission voted to allow the Railway Express Agency to put higher rates into effect September 1 on less-than-carload shipments.

The rate increases vary from 25 to 35 cents per 100 pounds and apply only

to less than carload shipments. The overall increase is about 6 percent, but on short hauls the percentage increase is considerably greater. For example, a rate of $1.00 per 100 pounds increases to $1.25 or $1.35, which is a 25- or 35-percent increase. A rate of $3.50 goes to $3.75 or $3.85, which means an increase of 9 or 10 percent.

The amounts of the increases are (1) 35¢ per hundred pounds between points within the Eastern territory and between points within the Mountain Pacific territory, minimum of 35¢ per shipment, and (2) 25¢ per hundred pounds, 25¢ minimum per shipment, between all other points.

Treasury Department

BUREAU OF CUSTOMS

DECISION CLASSIFIES PET FOOD CONTAINING 50 PERCENT FISH AS MIXED FEED:

The Bureau of Customs, U. S. Treasury Department, in a letter dated June 19, rendered the following decision--T. D. 54885(18):

Pet Food, canned, consisting of 50 percent fish, 30 percent water, and 20 percent corn grain products, salt, vitamins, and preservative, is classifiable as a mixed feed consisting of an admixture of grains or grain products with molasses, oil cake, oil-cake meal, or other feedstuffs under paragraph 730, Tariff Act of 1930.

* * * * *

FOREIGN ASSETS CONTROL DIVISION

IMPORTS OF SHRIMP FROM HONG KONG PROHIBITED:

The Foreign Assets Control Division of the U. S. Treasury Department has found it necessary to stop shrimp imports from Hong Kong. This action is due to the fact that shrimp produced in Red China has been coming into the United States through Hong Kong. The Treasury Department is developing a new procedure in cooperation with the Hong Kong Government. Until a satisfactory precedure can be developed all shrimp imports from Hong Kong are prohibited.

White House

UNITED STATES MEMBER APPOINTED TO INTERNATIONAL PACIFIC HALIBUT COMMISSION:

The White House on August 26, 1959 announced the appointment of Andrew W. Anderson as a United States member of the International Pacific Halibut Commission. Anderson, Assistant Director of the U. S. Bureau of Commercial Fisheries, succeeds Seton H. Thompson, who is now the Gulf and South Atlantic Regional Director with headquarters in St. Petersburg Beach, Fla.

Andrew W. Anderson

In 1930 Anderson joined the old U. S. Bureau of Fisheries as a statistician in Washington, D. C. The next step was his assignment as a Fishery Technologist at Gloucester, Mass., and Seattle, Wash. Later he was assigned the position of Chief of Market News, the Unit that is responsible for the daily Fishery Market News Reports. In 1943 he was named Chief of the Branch of Commercial Fisheries in the U. S. Fish and Wildlife Service. After the Service was reorganized into two Bureaus, he was appointed Assistant Director of the U. S. Bureau of Commercial Fisheries, which position he continues to occupy.

Eighty-Sixth Congress

(First Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions, hearings, and other actions by the House and Senate, as well as signature into law or other final disposition are covered.

CONGRESS ADJOURNS: The first session of the 86th Congress adjourned sine die on September 15, 1959. The second session will convene January 6, 1960. All legislation before either the Senate or House will remain in its status as of adjournment and will be subject to further consideration upon the convening of the second session. Bills that were introduced in the first session do not have to be reintroduced. Bills that were reported out of a committee or passed by one body of the Congress remain in status quo and do not have to again retrace their legislative steps.

BIOLOGICAL MARINE LIFE STUDIES: H. R. 9273 (Bonner), a bill to provide for a study of biological marine life in certain parts of the Atlantic and Pacific Oceans reasonably proximate to the Panama Canal and Central America; to the Committee on Merchant Marine and Fisheries; introduced in House September 14. Provides authorization for the Panama Canal Company to make a complete detailed study of the biological marine life, together with an oceanographic study with reference to the normal occurrence of such marine life. The bill further provides authority to place contracts for the performance of any part of the studies with qualified private organizations or on a cooperative and reimbursable basis with certain departments, agencies, or instrumentalities of the United States, for which studies there is authorized to be appropriated to the Panama Canal Company such sums as may be necessary to carry out the provisions of the Act.

COAST GUARD TRANSFER: H. R. 9214 (Bowles), a bill transferring the U. S. Coast Guard from the Treasury Department to the Department of Commerce; to the Committee on Merchant Marine and Fisheries; introduced in House September 11.

COLUMBIA RIVER FISHERIES INVESTIGATIONS: Both Houses of Congress on September 8 passed without amendment H. R. 9105, Public Works Appropriation, 1960 Fiscal, which action cleared the bill for the President.

The President September 9 vetoed H. R. 9105 and returned the bill to Congress (H. Doc. No. 226). In his veto message the President cited that H. R. 9105, was identical to previously vetoed H. R. 7509 in all respects (including the 67 unbudgeted projects), except that each individual project and appropriation item had been reduced by 2½ percent. In that Congress had failed to meet any of the objections outlined in the previous veto message to accompany H. R. 7509, and since a reduction of appropriations for individual items and projects might have the effect of impeding orderly work on going projects, the President returned the bill without approval with a recommendation to the Congress to enact a continuing resolution, effective until January 31, 1960, so that work in progress could proceed in an orderly way.

House and Senate September 10, on reconsideration, passed H. R. 9105 over the President's veto and the bill became law (P. L. 86-254). Included in the appropriation are funds for the Corps of Army Engineers and Bureau of Reclamation for water resources development, management, construction, and investigation programs including certain Columbia River Projects.

FEDERAL BOATING ACT OF 1958 AMENDMENT: Senate September 9 passed with amendment and sent back to the House H. R. 8728, to extend until January 1, 1961, the effective date of certain provisions of the Federal Boating Act (S. Rept. 875). Senate amendment would extend the effective date to April 1, 1961. The Federal Boating Act of 1958 included provisions for establishment of a new system of numbering small undocumented vessels propelled by machinery of 10 or more horsepower, using the navigable waters of the United States, and provided that the new system administered by the Coast Guard would go into effect April 1, 1960. The legislation is designed to provide the additional time required to put the new numbering system into effect and for Congress to authorize the necessary appropriation to carry out the provisions of the law, as amended.

Senate Report No. 875, Extending to April 1, 1961, the Effective Date of Certain Provisions of the Federal Boating Act of 1958 (September 2, 1959, 86th Congress, 1st Session, Report of the Senate Committee on Interstate and Foreign Commerce to accompany S. 2598), 3 pp., printed. Contains the purpose and provisions of the bill, Committee recommendations, and changes in existing law.

House September 11 concurred in Senate amendments and cleared H. R. 8728 for the President.

President September 21 announced that approval of H. R. 8728 was being withheld. The action constituted a pocket veto of the bill.

In the memorandum of disapproval, the President cited that the legislation was originally considered necessary because it had not been possible to obtain a supplemental appropriation for the Coast Guard to administer the new system. Since Congress passed the bill, however, the funds required for the implementation of the Federal Boating Act have been included in the Mutual Security Appropriation Act, 1960. The extension of time provided in the bill therefore was considered to be no longer needed.

FISHING VESSEL CONSTRUCTION SUBSIDIES: Senate September 11 passed H. R. 5421, providing for a program of assistance to correct inequities in the construction of fishing vessels, after amendment by substitution of text of companion bill S. 2578, in which the Senate requests the concurrence of the House. Amendment provides for inclusion of defense features not contained in House bill and authorizes to be appropriated for the 3-year program up to $5 million annually, as compared to the $1 million annual appropriations provided by the House. House took no action prior to adjournment. Bill to be placed on calendar for next session of Congress.

FISHING VESSEL MORTGAGE INSURANCE FUND: Senate September 11 passed without amendment and referred to the House S. 2481, continuing the application of the Merchant Marine Act to certain functions transferred to the Secretary of the Interior relating to fishing vessels. House took no action prior to adjournment.

INSECTICIDES EFFECT UPON FISH AND WILDLIFE: Senate September 10 concurred in House amendment to and cleared for the President S. 1575, authorizing continued studies on the effects of insecticides, herbicides, fungicides, and other pesticides upon fish and wildlife. The House amendment in which the Senate concurred provides for annual appropriations of $2,565,000 be authorized to carry out the provisions of the Act.

President September 16 signed into law S. 1575, authorizing continued studies on the effects of insecticides, herbicides, fungicides, and other pesticides upon fish and wildlife (P. L. 86-279).

MARINE GAME FISH RESEARCH: Senate Committee on Interstate and Foreign Commerce, in executive session on September 9, ordered favorably reported H. R. 5004, directing the Secretary of the Interior to make a continuing study of migratory game fish (S. Rept. 987).

Senate Report No. 987, Authorizing and Directing the Secretary of the Interior to Undertake Continuing Research on the Biology Fluctuations, Status, and Statistics of the Migratory Marine Species of Game Fish of the United States and Contiguous Waters (September 9, 1959, 86th Congress, 1st Session, Report of the Senate Committee on Interstate and Foreign Commerce to accompany H. R. 5004. . . .), 3 pp., printed. Contains the purpose and provisions of the bill, committee recommendations, and departmental report.

Senate September 11 passed H. R. 5004, without amendment, and cleared the bill for the President.

President September 22 signed into law H. R. 5004, providing for a continuing marine game fish research program, and authorizing to be appropriated not more than $2,700,000 annually to carry out the provisions of the Act (P. L. 86-359).

OCEANOGRAPHY: S. 2692 (Magnuson and 10 other Senators), a bill to advance the marine sciences, to establish a comprehensive 10-year program of oceanographic research and surveys; to promote commerce and navigation, to secure the national defense; to expand ocean resources; to authorize the construction of research and survey ships and facilities; to assure systematic studies of effects of radioactive materials in marine environments; to enhance the general welfare and for other purposes; to the Committee on Interstate and Foreign Commerce; introduced in Senate September 11. The bill, titled "The Marine Sciences and Research Act of 1959" provides for a 10-year program relating to objectives expressed in Senate Resolution 136, introduced June 22 and adopted by Senate July 15, 1959, in regards to oceanography and the report of the Committee on Oceanography to the President.

OYSTER INDUSTRY ASSISTANCE: Senate Committee on Interstate and Foreign Commerce, in executive session on September 9, ordered favorably reported S. 2632, to assist the States of New Jersey and Delaware in developing a strain of oysters resistant to causes which threaten the oyster industry on the east coast (S. Rept. 985).

Senate Report No. 985, Assistance to Delaware-New Jersey Oyster Industry (September 9, 1959, 86th Congress, 1st Session, Report of the Senate Committee on Interstate and Foreign Commerce to accompany S. 2632. . . .), 3 pp., printed. Contains the purpose and provisions of the bill, correspondence from sponsors of the legislation, committee recommendations, and estimate of the cost of the program.

Senate September 11 passed S. 2632 without amendment and referred the bill to the House. House took no action prior to adjournment of Congress.

SHRIMP IMPORT DUTIES: H. R. 9274 (Bonner), a bill to amend the Tariff Act of 1930 to provide for the establishment of country-by-country quotas for the importation of shrimps and shrimp products, to impose a duty on all unprocessed shrimp imported in excess of the applicable quota, and to impose a duty on processed shrimp and prohibit its importation in excess of the applicable quota; to the Committee on Ways and Means; introduced in House September 14. Identical to H.R. 8769 and related bills previously introduced which provide for duties and quotas on shrimp importations to protect the domestic industry and for other purposes.

SMALL BUSINESS ACT AMENDMENT: Senate September 10 passed with amendment in which the Senate requested the concurrence of the House H. R. 8599, to amend in several respects the Small Business Act. The amendment provides that certain funds are to remain available for grants for research and management counseling during fiscal year 1960. The legislation provides the additional funds necessary to operate the Small Business Administration's regular business loan program over the recess, into 1960, and provides authority for appropriations to continue the programs of grants for studies, research, and counseling concerning the management, financing, and operation of small business enterprises.

House September 11 concurred in Senate amendments and cleared H. R. 8599 for the President.

President September 22 signed into law H. R. 8599, to increase the loan authority of the Small Business Administration from $500 to $700 million (P. L. 86-367).

SMALL BUSINESS INVESTMENT ACT OF 1958 AMENDMENT: The Senate September 10 passed without amendment and cleared for the House S. 2611, amendments to the Small Business Investment Act. The legislation is designed to liberalize the kind of investments which small investment companies may make so as to encourage the formation of small business investment companies. House took no action prior to adjournment.

TREATIES ON THE LAW OF THE SEA: The President September 8, 1959, signed the conventions adopted at the Conference of the Law of the Sea held at Geneva, Switzerland, last April.

The President September 9 transmitted to the Senate for ratification five treaties formulated at the United Nations Conference (1) Convention on the Territorial Sea and the Contiguous Zone, (2) Convention on the High Seas, (3) Convention on Fishing and Conservation of Living Resources of the High Seas, (4) Convention on the Continental Shelf, and (5) Optional Protocol of the Signature Concerning the Compulsory Settlement of Disputes; together with accompanying documents and a report of the Acting Secretary of State; referred to the Committee on Interstate and Foreign Commerce.

The treaties reached the Senate after the Committee had concluded meetings for the 1st session of the 86th Congress, and it is unlikely that another meeting will be held before Congress reconvenes in January. Prompt action is expected when the Congress reconvenes. The 4 conventions adopted at the Conference of the Law of the Sea at Geneva, Switzerland, last April were signed by President Eisenhower on Tuesday, September 8.

WATER POLLUTION STUDIES: H. J. Res. 522 (Reuss), a House Joint Resolution directing the Secretary of Health, Education, and Welfare to conduct certain studies and investigations relating to water pollution, and for other purposes; referred to the Committee on Public Works; introduced in House September 8. Provides for a number of studies of water pollution, including (1) the effects of disposing of nuclear wastes in the ocean as well as in the navigable waters of the United States; and (2) methods of controlling water pollution caused by the disposition of sewage and garbage from ships operating in the navigable waters of the United States. Further provides that, based upon such investigations and studies, uniform laws be formulated for possible enactment by States and political subdivisions to prevent water pollution, and to submit to Congress proposals for any Federal legislation necessary to correct any water pollution problem revealed by such studies and investigations.

THE FISHING BOAT OF 1975

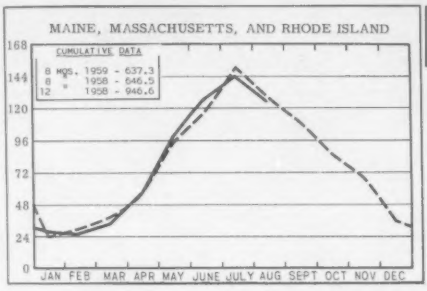
Delegates to the Second World Fishing Boat Congress had a look into the future when, at one session, they discussed the fishing boat of 1975. At the 1953 Congress, states a preamble to this discussion, there was a paper about gas-turbine propulsion of fishing-boats, and a number of papers on factoryship design. Many participants felt that it was too early to take up such subjects.

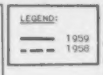
Now, however, gas-turbine trawlers have been put into operation, and dozens of huge factoryships are operating successfully in waters not before known to the fishing industry. Development in fishing-craft design will not slow down but, on the contrary, will accelerate as technical progress continues. The time might not be very far ahead when the first atomic-powered fishing craft will operate. Similarly, with the advance of stern trawling, stabilizers might soon be introduced to make working conditions for the crew much more comfortable.

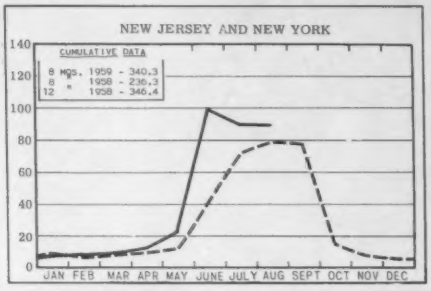
With progress in automation, fishing boats might be designed to operate with much smaller crews. It might even be possible to send large factoryships to the fishing ground, manned by a skeleton crew, and, when needed, send out the main working crew by supersonic planes. The fishing craft of the future might even be airborne with adjustable jets to keep them stationary or at low speed when fishing, and then flying with their catch direct to consumption centers far inland. (The South African Shipping News and Fishing Industry Review, May 1959.)

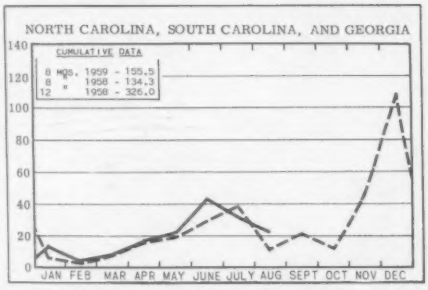
CHART I - FISHERY LANDINGS for SELECTED STATES

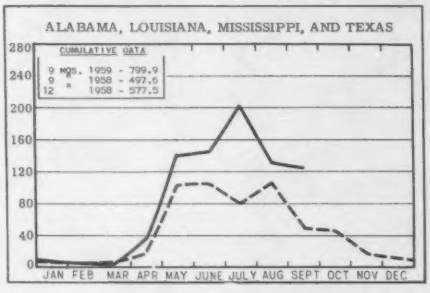
In Millions of Pounds

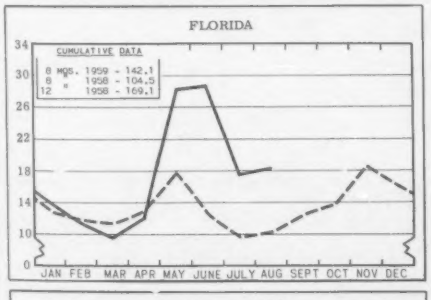


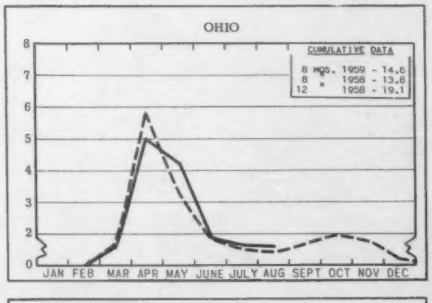


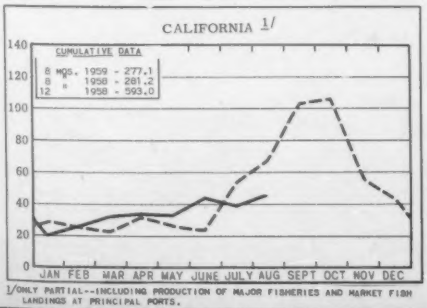












1/ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

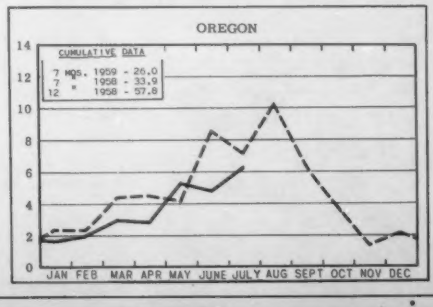
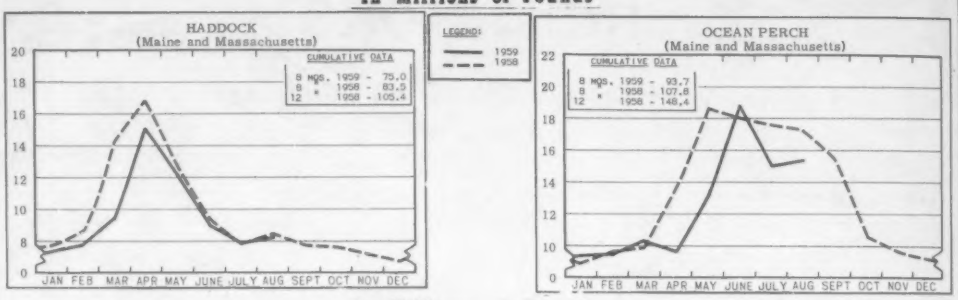
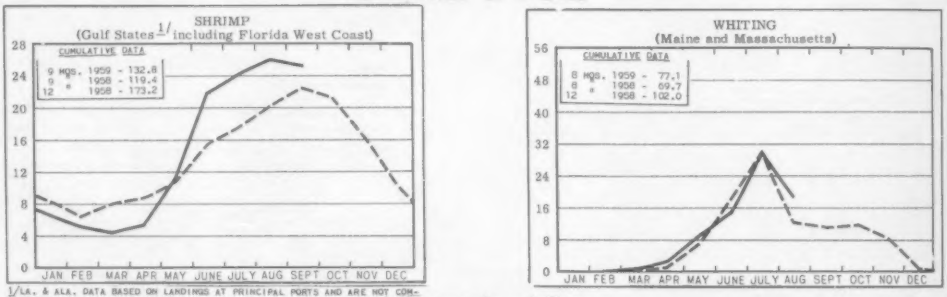


CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds

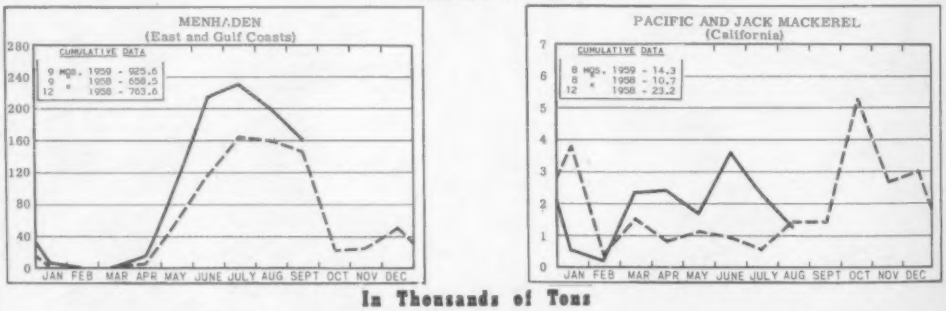


In Millions of Pounds


SHRIMP
(Gulf States 1/ including Florida West Coast)
CUMULATIVE DATA
8 MOS. 1959 - 132.8
8 " 1958 - 119.4
12 " 1958 - 173.2
WHITING
(Maine and Massachusetts)
CUMULATIVE DATA
8 MOS. 1959 - 77.1
8 " 1958 - 69.7
12 " 1958 - 102.0
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/ LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

In Thousands of Tons


MENHADEN
(East and Gulf Coasts)
CUMULATIVE DATA
8 MOS. 1959 - 925.6
8 " 1958 - 658.5
12 " 1958 - 763.6
PACIFIC AND JACK MACKEREL
(California)
CUMULATIVE DATA
8 MOS. 1959 - 14.3
8 " 1958 - 10.7
12 " 1958 - 23.2
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

In Thousands of Tons

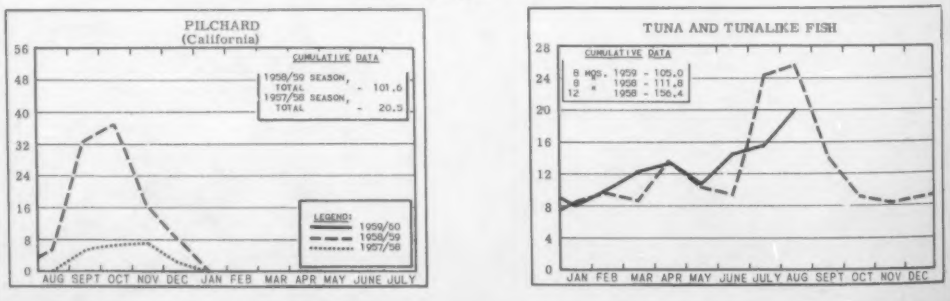
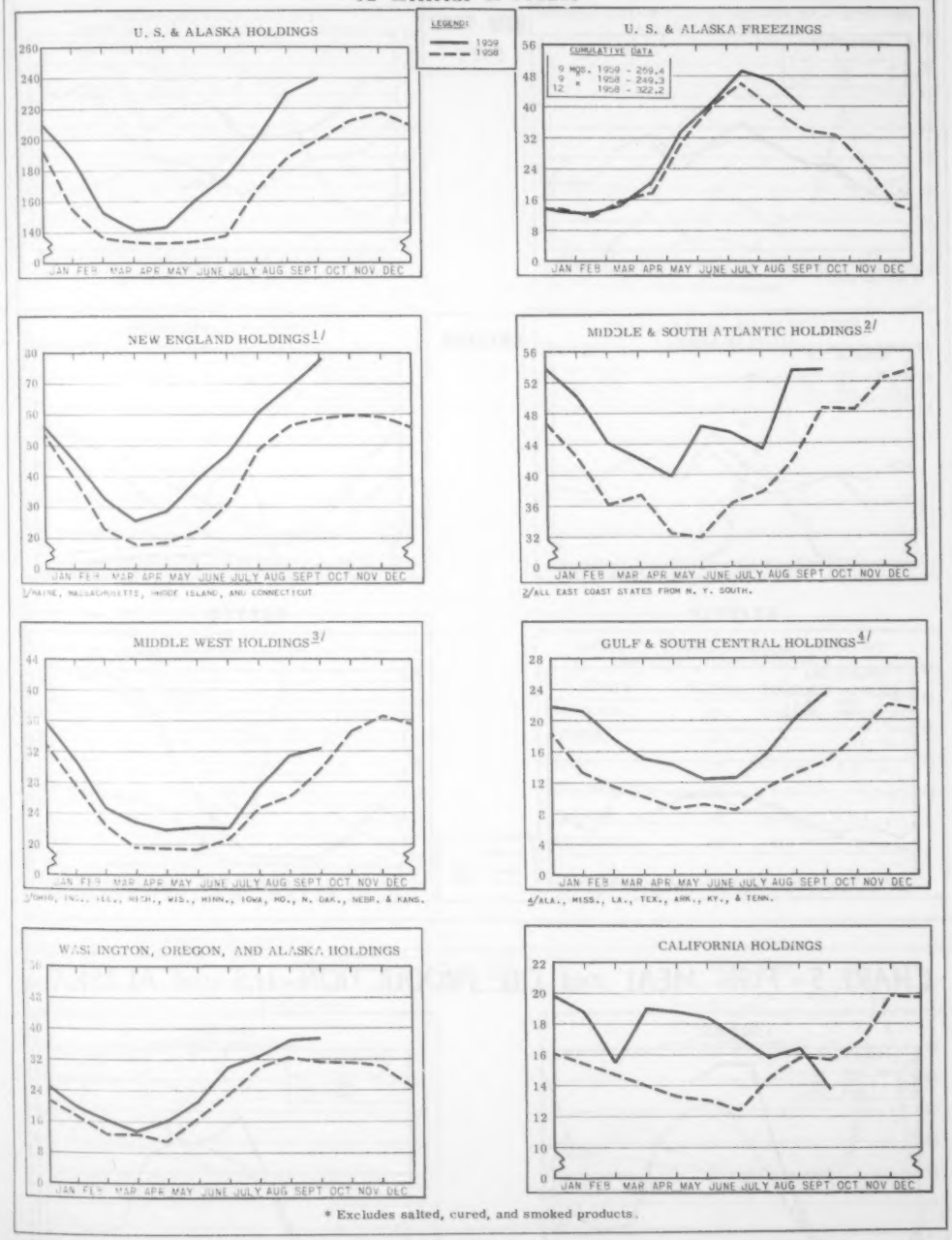


CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

In Millions of Pounds


U. S. & ALASKA HOLDINGS
LEGEND:
1959
1958
U. S. & ALASKA FREEZINGS
CUMULATIVE DATA
9 MOS. 1959 - 269.4
9 " 1958 - 249.3
12 " 1958 - 322.2
NEW ENGLAND HOLDINGS 1/
MIDDLE & SOUTH ATLANTIC HOLDINGS 2/
MIDDLE WEST HOLDINGS 3/
GULF & SOUTH CENTRAL HOLDINGS 4/
WASHINGTON, OREGON, AND ALASKA HOLDINGS
CALIFORNIA HOLDINGS
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT.

2/ALL EAST COAST STATES FROM N. Y. SOUTH.

3/OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR. & KANS.

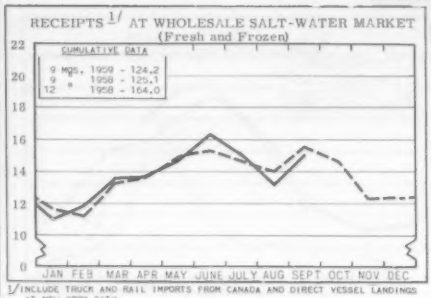
4/ALA., MISS., LA., TEX., ARK., KY., & TENN.

* Excludes salted, cured, and smoked products.

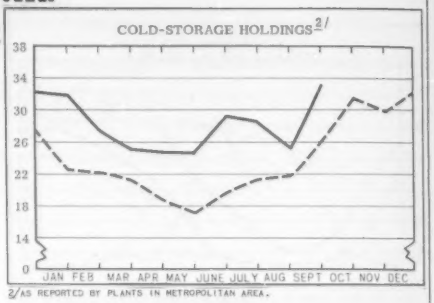
CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pounds

NEW YORK CITY

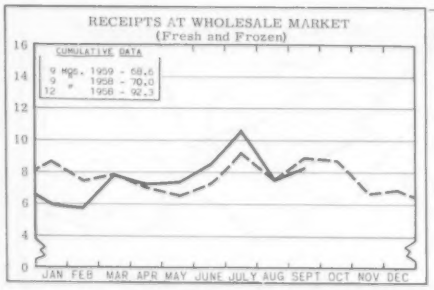

RECEIPTS 1/ AT WHOLESALE SALT-WATER MARKET
(Fresh and Frozen)
CUMULATIVE DATA
9 MOS. 1959 - 124.2
9 " 1958 - 125.1
12 " 1958 - 164.0
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

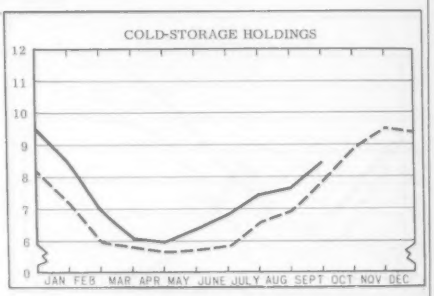
1/INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.



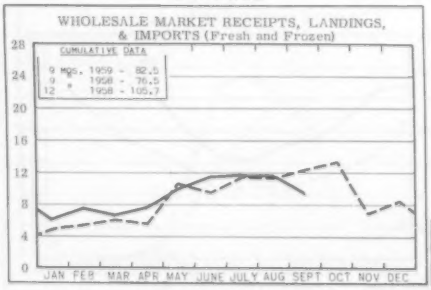
2/AS REPORTED BY PLANTS IN METROPOLITAN AREA.

CHICAGO

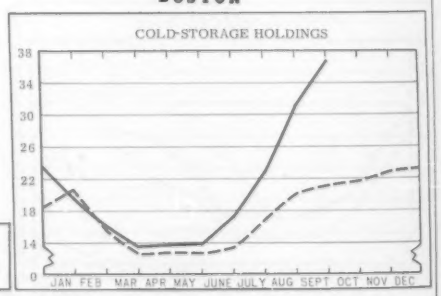

RECEIPTS AT WHOLESALE MARKET
(Fresh and Frozen)
CUMULATIVE DATA
9 MOS. 1959 - 68.6
9 " 1958 - 70.0
12 " 1958 - 92.3
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC



SEATTLE

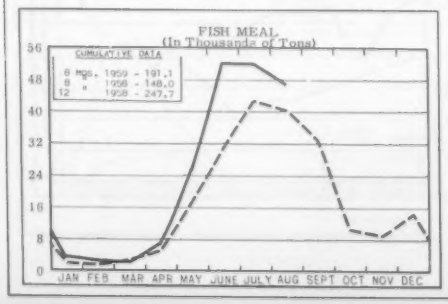

WHOLESALE MARKET RECEIPTS, LANDINGS,
& IMPORTS (Fresh and Frozen)
CUMULATIVE DATA
9 MOS. 1959 - 82.5
9 " 1958 - 76.5
12 " 1958 - 105.7
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

BOSTON



LEGEND:
1959
1958

CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA


FISH MEAL
(In Thousands of Tons)
CUMULATIVE DATA
8 MOS. 1959 - 191.1
8 " 1958 - 148.0
12 " 1958 - 247.7
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

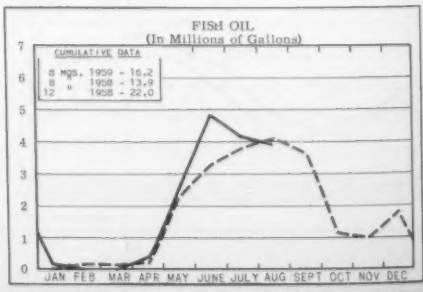
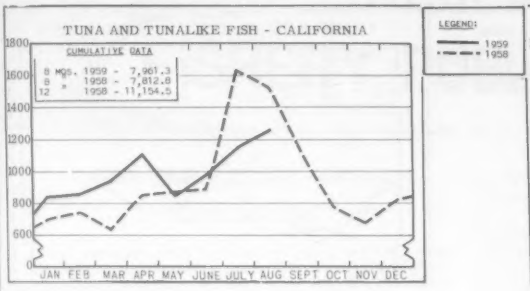
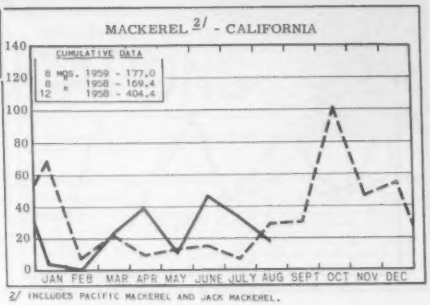

FISH OIL
(In Millions of Gallons)
CUMULATIVE DATA
8 MOS. 1959 - 16.2
8 " 1958 - 13.9
12 " 1958 - 22.0
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

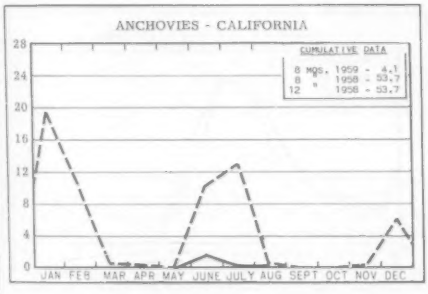
CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

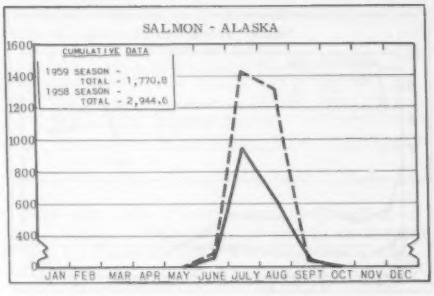
In Thousands of Standard Cases

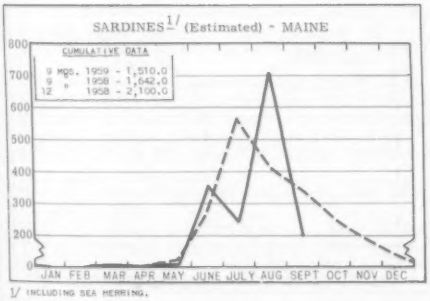

TUNA AND TUNALIKE FISH - CALIFORNIA
CUMULATIVE DATA
8 MOS. 1959 - 7,961.3
8 " 1958 - 7,812.8
12 " 1958 - 11,154.5
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC


MACKEREL 2/ - CALIFORNIA
CUMULATIVE DATA
8 MOS. 1959 - 177.0
8 " 1958 - 169.4
12 " 1958 - 404.4
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

2/ INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.



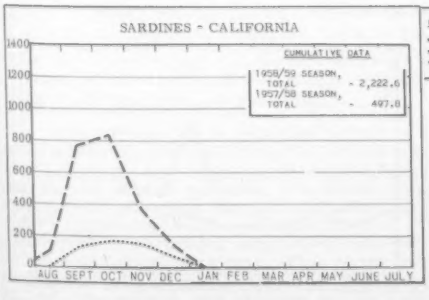

SALMON - ALASKA
CUMULATIVE DATA
1959 SEASON - TOTAL - 1,770.8
1958 SEASON - TOTAL - 2,944.6
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

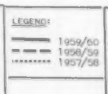

SARDINES 1/ (Estimated) - MAINE
CUMULATIVE DATA
9 MOS. 1959 - 1,510.0
9 " 1958 - 1,642.0
12 " 1958 - 2,100.0
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/ INCLUDING SEA HERRING.

STANDARD CASES

Variety	No. Cans	Designation	Net Wgt.
SARDINES.....	100	¼ drawn	3¾ oz.
SHRIMP.....	48	--	5 oz.
TUNA.....	48	# ½ tuna	6 & 7 oz.
PILCHARDS...	48	# 1 oval	15 oz.
SALMON.....	48	1-lb. tall	16 oz.
ANCHOVIES...	48	½-lb.	8 oz.


SARDINES - CALIFORNIA
CUMULATIVE DATA
1958/59 SEASON, TOTAL - 2,222.6
1957/58 SEASON, TOTAL - 497.8
AUG SEPT OCT NOV DEC JAN FEB MAR APR MAY JUNE JULY



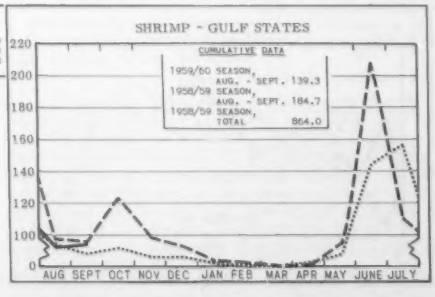
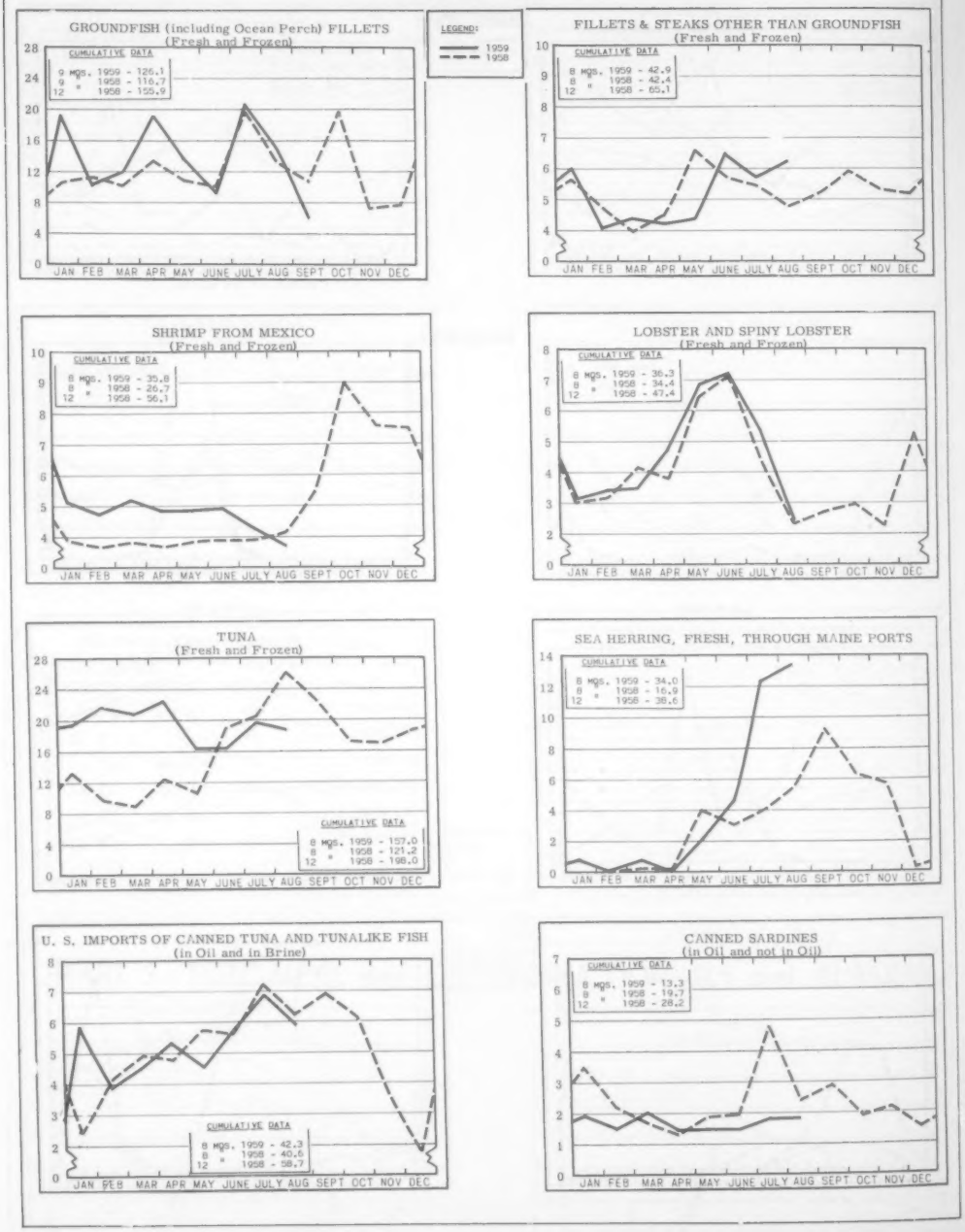

SHRIMP - GULF STATES
CUMULATIVE DATA
1959/60 SEASON, AUG. - SEPT. 139.3
1958/59 SEASON, AUG. - SEPT. 184.7
1958/59 SEASON, TOTAL 864.0
AUG SEPT OCT NOV DEC JAN FEB MAR APR MAY JUNE JULY

CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds


GROUNDFISH (including Ocean Perch) FILLETS
(Fresh and Frozen)
CUMULATIVE DATA
9 MOS. 1959 - 126.1
9 " 1958 - 110.7
12 " 1958 - 155.9
LEGEND:
1959
1958
FILLETS & STEAKS OTHER THAN GROUNDFISH
(Fresh and Frozen)
CUMULATIVE DATA
8 MOS. 1959 - 42.9
8 " 1958 - 42.4
12 " 1958 - 65.1
SHRIMP FROM MEXICO
(Fresh and Frozen)
CUMULATIVE DATA
8 MOS. 1959 - 35.8
8 " 1958 - 26.7
12 " 1958 - 56.1
LOBSTER AND SPINY LOBSTER
(Fresh and Frozen)
CUMULATIVE DATA
8 MOS. 1959 - 36.3
8 " 1958 - 34.4
12 " 1958 - 47.4
TUNA
(Fresh and Frozen)
CUMULATIVE DATA
8 MOS. 1959 - 157.0
8 " 1958 - 121.2
12 " 1958 - 198.0
SEA HERRING, FRESH, THROUGH MAINE PORTS
CUMULATIVE DATA
8 MOS. 1959 - 34.0
8 " 1958 - 16.9
12 " 1958 - 38.6
U. S. IMPORTS OF CANNED TUNA AND TUNALIKE FISH
(in Oil and in Brine)
CUMULATIVE DATA
8 MOS. 1959 - 42.3
8 " 1958 - 40.6
12 " 1958 - 58.7
CANNED SARDINES
(in Oil and not in Oil)
CUMULATIVE DATA
8 MOS. 1959 - 13.3
8 " 1958 - 19.7
12 " 1958 - 28.2
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
FL - FISHERY LEAFLETS.
SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SSR - FISH. SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number Title

CFS-2087 - Texas Landings, May 1959, 3 pp.
CFS-2088 - Frozen Fish Report, June 1959, 8 pp.
CFS-2089 - Shrimp Landings, March 1959, 6 pp.
CFS-2094 - Alabama Landings, April 1959, 2 pp.
CFS-2098 - Rhode Island Landings, April 1959, 3 pp.
CFS-2101 - Fish Meal and Oil, June 1959, 2 pp.
CFS-2102 - North Carolina Landings, June 1959, 3 pp.
CFS-2103 - Georgia Landings, June 1959, 2 pp.
CFS-2104 - New Jersey Landings, June 1959, 3 pp.
CFS-2105 - South Carolina Landings, June 1959, 2 pp.
CFS-2106 - Shrimp Landings, April 1959, 6 pp.
CFS-2107 - Florida Landings, June 1959, 7 pp.
CFS-2108 - Frozen Fish Report, July 1959, 8 pp.
CFS-2109 - Maine Landings, June 1959, 3 pp.
CFS-2112 - Fish Sticks and Portions, April-June 1959, 3 pp.
CFS-2113 - Massachusetts Landings, May 1959, 5 pp.
CFS-2117 - Rhode Island Landings, May 1959, 3 pp.
CFS-2122 - Texas Landings, June 1959, 3 pp.
CFS-2131 - Louisiana Landings, 1958 Annual Summary, 4 pp.
CFS-2135 - Rhode Island Landings, June 1959, 3 pp.

FL-449 - Organizations and Officials Concerned with the Commercial Fisheries, 1959, 19 pp.

FL-478h - Canned Fish Consumer Purchases by Family Characteristics (October 1958-March 1959), 53 pp., illus., August 1959.

This information is collected as part of a broad marketing research program directed toward improving and expanding the canned tuna, salmon, and sardine markets. It is projected from a nationwide consumer panel of approximately 6,000 families representing 22,000 persons. The data represent estimated purchases of canned fish by household consumers only. This report summarizes data on household consumer purchases of canned tuna, salmon, and sardines for the 6 months period, October 1958-March 1959. It is developed from data appearing in the current series of monthly reports entitled Canned Fish Consumer Purchases. The data are based on reports covering 26 full weeks, whereas monthly data are derived from reports covering 4-week periods. The purpose of this report is to provide additional information concerning buying practices of households as related to regions, city-size locations, and other socio-economic factors.

Wholesale Dealers in Fishery Products, 1959 (Revised):
SL- 6 - New York Coastal Area.
SL-24 - Minnesota (Lakes Area).
SL-34 - Wisconsin (Mississippi River and Tributaries).
SL-36 - Iowa (Mississippi River and Tributaries).

SSR-Fish. No. 298 - Leading Adult Squawfish (Ptychocheilus oregonensis) Within an Electric Field, by Galen H. Maxfield, Kenneth L. Liscom, and Robert H. Lander, 19 pp., illus., April 1959.

Sep. No. 562 - Effect of Radiation Pasteurization on the Storage Life and Acceptability of Some North Atlantic Fish.

Sep. No. 563 - Observations on Trawl-Door Spread and a Discussion of Influencing Factors.

Sep. No. 564 - Research in Service Laboratories (October 1959): Contains these articles--"Possible Atomic Energy Commission Assistance of Research on Radiation Preservation of Fish," "Optimum Level of Menhaden Fish Meal and Solubles as Sources of Growth Factors in Broiler Diets," "Supplementary Effect of Fish Meal and Fish Solubles in Chick Diets," "Fish Meal as a Source of Unknown Growth Factor and High-Quality Protein," "Feed Formulation Utilizing a High-Speed Digital Computer," and "Gas Chromatographic Studies of Fish Spoilage."

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

(Chicago) Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Market Prices, July 1959, 13 pp. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; and wholesale prices for fresh and frozen fishery products; for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina

and Maryland, August 1959, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 So. King St., Hampton, Va.) Fishery landings and production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.

New England Fisheries--Monthly Summary, July 1959, 22 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Reviews the principal New England fishery ports, and presents food fish landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and landings and ex-vessel prices for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; for the month indicated.

Progress Report on Alaska Fisheries Management and Research, 1958, 34 pp., illus., processed. (U. S. Fish and Wildlife Service, Bureau of Commercial Fisheries, Juneau, Alaska.) Describes the accomplishments of the Alaska Region of the Bureau of Commercial Fisheries during 1958. The report is divided into two parts: the first part presents highlights of 1958 Alaska salmon fishery; the second reviews the marine fisheries. It presents information and statistical data on the salmon fisheries of Southeastern Alaska, Yakutat, Copper River-Bering River, Yakataga, Prince William Sound, Cook Inlet, Kodiak, Chignik, Alaska Peninsula, Bristol Bay, and Yukon River and Arctic Area. The review of the marine fisheries describes the fisheries for herring, crab, shrimp, and clam. A table is also included showing the salmon pack for 1958 by area.

(Seattle) Washington, Oregon, and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, July 1959, 10 pp. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 South, Seattle 4, Wash.) Includes landings and local receipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle and Astoria, (Ore.) wholesale dealers; also Northwest Pacific halibut landings; and Washington shrimp landings; for the month indicated.

THE FOLLOWING TRANSLATIONS OF FOREIGN LANGUAGE ARTICLES ARE NOT FOR GENERAL DISTRIBUTION. WRITE TO U. S. FISH AND WILDLIFE SERVICE, BUREAU OF COMMERCIAL FISHERIES, FISHERY BIOLOGICAL LABORATORY, HONOLULU, HAWAII, FOR INFORMATION.

Fishing Ground of Goshumagro (Australian Bluefin) and the Fishing Grounds of Bigeye and Yellowfin in the Eastern Equatorial Sea Area, by Tadao Kamimura, 7 pp., processed, translated from Japanese. (Reprinted from Tuna Fishing, No. 53, October 1958, pp. 27-32.)

On Estimating Tuna Fishing Conditions in the North Pacific Ocean, by Akira Suda, 7 pp., processed, translated from Japanese. (Reprinted from Tuna Fishing, no. 64, November 10, 1958, pp. 27-31.)

On the Mechanism of Variation in Water Temperature and Chlorinity of Upper Layer in the Seas Southwest off Kyushu and Around Nansei-Shoto, by Nobue Watanabe, translation from Japanese, 13 pp., illus., processed. (Reprinted from Bulletin of Tokai Regional Fisheries Research Laboratory, no. 21, August 1958, pp. 15-24.)

The Operating Conditions of Japanese Tuna Long-Liner Boats, Sea Currents and the Fishing Condition of Yellowfin and Albacore in the Equatorial Waters of the Atlantic Ocean, by Nagai, Nakagome, Kobayashi, and Shimosato, 8 pp., processed, translated from Japanese. (Reprinted from Tuna Fishing, no. 57, 1959, pp. 21-24.)

On the Ovaries of the Skipjack, KATSUWONUS PELAMIS (Linnaeus), Captured in the Fishing Grounds Along the Japanese Coast, by Masakazu Yao, 9 pp., processed, translated from Japanese. (Reprinted from Bulletin of the Tohoku Regional Fisheries Research Laboratory, no. 5, October 1955, pp. 43-52.)

On the Stomach Contents of the Skipjack, KATSUWONUS PELAMIS, by Hideyuki Hotta and Toru Ogawa, translation from Japanese, 30 pp., illus., processed. (Reprinted from Bulletin of Tohoku Regional Research Laboratory, no. 4, March 1955, pp. 62-82.)

A Study of Spawning of Skipjack in the Satsunan Sea Area, by Hiroshi Yabe, 25 pp., illus., processed, translated from Japanese. (Reprinted from Contributions of Fisheries Experimental Station, no. 115, 18 pp.)

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

AGAR:

"Studies on the Antisepsis of Agar During the Manufacturing Process in the Mild Winter. II--On the Physicochemical Changes of Agar and its Intermediate Product, 'Tokoroten' in the Spoilage," by Kiroaki Fujusawa and Terutake Sukegawa, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 23, 1957, pp. 306-314, illus., printed in Japanese with English abstract, figures, and tables. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

ALMANAC:

The Nautical Almanac for the Year 1960, 276 pp., illus., printed, $2. Department of Defense,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Washington 25, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.)

ANTIBIOTICS:
Antibiotics in Food Preservation, by Neil Tomlinson, Studies 1957 from the Stations of the Fisheries Research Board of Canada, FRB No. 505, printed. Fisheries Research Board of Canada, Ottawa, Canada.

ANTIOXIDANTS:
"Comparative Study of a Few Commercial Antioxidants," by Charles Pacquot and J. Mercier, article, Journal of the American Oil Chemists' Society, vol. 36, February 1959, pp. 20-21, printed. American Oil Chemists Society, 35 E. Wacker Drive, Chicago 1, Ill.

BIOCHEMISTRY:
"The Action of Pseudomonas on Fish Muscle. 3--Identification of Organisms Producing Fruity and Oniony Odors," by C. H. Castell, Maxine F. Greenough, and Jacqueline Dale, article, Journal of the Fisheries Research Board of Canada, vol. 16, January 1959, pp. 13-19, printed. Queen's Printer and Controller of Stationery, Ottawa, Canada.

"The Action of Pseudomonas on Fish Muscle. 4--Relation Between Substrate Composition and the Development of Odors by Pseudomonas fragi," by C. H. Castell and Maxine F. Greenough, article, Journal of the Fisheries Research Board of Canada, vol. 16, January 1959, pp. 21-31, printed. Queen's Printer and Controller of Stationery, Ottawa, Canada.

"Browning Reaction Initiated by Gamma Irradiation," by R. W. Liggett, C. E. Feagel, and J. Y. Ellenberg, article, Journal of Agricultural and Food Chemistry, vol. 7, April 1959, pp. 277-280, printed. Journal of Agricultural and Food Chemistry, American Chemical Society, 1801 K St., N. W., Washington 6, D. C.

"Determination Method of Freshness of Fish Muscle with Trimethylamine," by Susumu Horie and Yutaka Sekine, article, Journal of Tokyo University of Fisheries, vol. 42, 1956, printed. Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

"On the Determination of Trimethylamine and Trimethylamine Oxide. A Modification of the Dyer Method," by Yoshiro Hashimoto and Tomotoshi Okaichi, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 23, no. 5, 1957, pp. 269-272, illus., printed in Japanese with English abstract, figures, and tables. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-Kaigandori 6-chome, Tokyo, Japan.

Thermal Copolymerization of Amino Acids to a Product Resembling Protein, by Sidney W. Fox, and Kaoru Harada, 1 p., illus., printed. (Reprinted from Science, vol. 128, no. 3333, November 14, 1958, p. 1214.) Oceanographic Institute and Chemistry Department, Florida State University, Tallahassee, Fla.

BIOLOGICAL RESEARCH:
Preliminary Report BROWN BEAR Cruise 144 off the Washington, Oregon, and Northern California Coasts, 18 July to 31 August 1956, by Herbert F. Frolander and John H. Lincoln with a section on "Geological Observation," by Thomas F. Budinger, 20 pp., illus., processed. University of Washington, Department of Oceanography, Seattle 5, Wash., November 1956.

CALIFORNIA:
"A Revised Check List of the Freshwater and Anadromous Fishes of California," by Leo Shapovalov, William A. Dill, and Almo J. Cordone, article, California Fish and Game, vol. 45, no. 3, July 1959, pp. 159-180, printed. California Department of Fish and Game, 722 Capital Ave., Sacramento 14, Calif.

CANADA:
British Columbia Salmon Spawning Report - 1958, 15 pp., processed. Department of Fisheries, 110 Georgia Street West, Vancouver 5, B. C., Canada, March 17, 1959.

CARP:
The Ecology and Use of Carp in Utah, by William F. Sigler, Bulletin 405, 63 pp., illus., printed. Utah State University, Logan Agriculture Experiment Station, December 1958, Logan, Utah.

CHUBS:
"Study Ecology and Food Habits of the Chubs (Leucichthys sp.) and Their Relation to the Ecology of Lake Michigan," by Silvestre V. Bersamin, article, Papers of the Michigan Academy of Science, Arts, and Letters, vol. 43, part 1, 1958, pp. 107-118, printed. Papers of the Michigan Academy of Science, Arts, and Letters, The University of Michigan Press, Ann Arbor, Mich.

CONCHS:
The Crown Conch (MELONGENA CORONA (Gmelin); Its Habits, Sex Ratios, and Possible Relations to the Oyster, by Ralph R. Hathaway, 6 pp., processed. (Reprinted from Proceedings of the National Shellfisheries Association, vol. 48, 1958, pp. 189-193.) Oceanographic Institute, Florida State University, Tallahassee, Fla.

DEEP-SEA FISH:
"Rost i Vozrast GluboKovodnykh Ryb" (Age and Growth of Deep-Sea Fish), by E. B. Kulikova, article, Akademiia Nauk SSSR. Institut Okeanologii, vol. 20, 1957, pp. 347-355, printed in Russian. Akademii Nauk SSSR. Institut Okeanologii, Trudy., Moscow, U. S. S. R.

DIRECTORIES:
Marine Digest, Pacific Northwest Maritime, 1959 Directory, 372 pp., illus., printed, $2. Marine Digest Publishing Co., 79 Columbia St., Seattle 4, Wash. Contains a world-wide shipping guide and indexed sections on Washington, Oregon, and British Columbia. Lists shippers and carriers in major ports along the Pacific Northwest coast.

ELECTROFISHING:
"The Development and Evaluation of Interrupted

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Direct Current Electrofishing Equipment," by Max Dean Rollefson, article, Colorado Cooperative Fisheries Research Unit Quarterly Report, vol. 4, 1958, pp. 38-40, printed. Colorado Cooperative Fisheries Research Unit, 243 Forestry Bldg., Colorado State University, Fort Collins, Colo.

FACTORY TRAWLER:
"Quick-Freeze Factory Trawler 'Fairtry II'," article, Modern Refrigeration and Air Control News, vol. 62, no. 733, April 1959, p. 374, illus., printed. Modern Refrigeration and Air Control News, Maclaren House, 131 Great Suffolk Street, London S. E. 1, England. Describes the New Fairtry II (sistership of the revolutionary Fairtry I), which was launched early this year in England.

FACTORYSHIPS:
"Fairtry" Factory Fishing Fleet, supplement to Fishing News, no. 2401, April 24, 1959, 28 pp., illus., printed. Fishing News, Suite 27, 110 Fleet St., London, E. C. 4, England. A supplement devoted to articles concerning factory trawlers. Includes articles on "Famous Shipping and Whaling Company Pioneers Modern Factory Trawler"; "Fairtry Story is Told"; "How Problems Were Met and Improvements Made"; "Skipper Romyn Sums up His Experiences on Fairtry and Gives Frank Comment"; "Builders Give Full Technical Details of the New Fairtrys"; "Fairtry II Equipped with Diesel-Electric for Powering"; "Simons of Renfrew Have Specialized for Nearly a Century in Complicated 'Working' Ships"; "The Shipyard that Crossed the Atlantic"; "Extra Fish Meal Capacity Will Win More Money"; "Fish Factory Enlarged to Handle 30 Tons of Fish a Day"; "Special Log Gives Sensitive Accuracy in Speed and Distance"; "Fine Range of Equipment Provided to Find the Fish"; "Good Pay and Conditions Attract Good Men"; "Marketing on Merit Achieved Deserved Success"; and "Sound Refrigeration Ensures a Fine Product."

FARM PONDS:
"Fish for Pet Food from the Arkansas Farmlands," by Walter G. Jones, article, Petfood Industry, vol. 1, no. 8, August 1959, pp. 21-23, 47, illus., printed. Petfood Industry, Garden State Publishing Co., Sea Isle City, N. J.

FISH FLOUR:
Fish Flour: An Account of Its Properties by the Fishing Industry Research Institute, Cape Town, Memorandum No. 89, July 1958, 3 pp., printed. The Fishing Industry Research Institute, University of Cape Town, Rondebosch, C. P., Union of South Africa.

FISH MEAL:
"The Self-Heating of Fish Meal," by G. M. Dreosti and A. N. Rowan, article, Annual Report, Fishing Industry Research Institute, April-December 1956, vol. 10, pp. 26-28, printed. Fishing Industry Research Institute, Cape Town, Union of South Africa, 1957.

FISH OIL:
"Preparation of a Coating Material By Chlorination of Fish Oil. III--On the Fire-Retardant Property of the Product," by Kosaku Suzuki, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 24, nos. 6 and 7, 1958, pp. 515-518, illus., printed in Japanese with English abstract, figures, and table. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

FLORIDA:
A Data Report of Florida Gulf Coast Cruises, by Frank Chew, S. J. Bein, and J. H. G. Stimson, 122 pp., illus., printed. The Marine Laboratory, University of Miami, Miami 49, Fla. Contains hydrographic and chemical data collected during the 8 major cruises sponsored by the Florida State Board of Conservation during the two-year period beginning July 1955.

FOOD AND AGRICULTURE ORGANIZATION:
Catalogue of FAO Fisheries Publications, compiled by Patricia M. Andrews, FAO/59/4/3186, May 1959, 17 pp., processed. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy. Lists periodicals; FAO fisheries studies; papers; separate publications; publications of the General Fisheries Council for the Mediterranean, Indo-Pacific Fisheries Council, and Latin American Fisheries Training Centers; reports on the Expanded Technical Assistance Program; and reprints.

Food and Agriculture Legislation, vol. VII, no. 1, 1958, Ceylon, XVI.2/57.1, 2 pp., printed, $1. Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N. Y.

A Standard Terminology and Notation for Fishery Dynamics, by S. J. Holt, J. A. Gulland, C. Taylor, and S. Kurita, FAO/59/5/3817, 4 pp., printed. (Reprinted from Journal du Conseil International pour l'Exploration de la Mer, vol. 24, 1959, pp. 239-242.) Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy. In view of the rapid increase in publications dealing with various aspects of fishery dynamics, the need was recognized at the Special Meeting held by the Research and Statistics Committee of the International Commission for the Northwest Atlantic Fisheries at Biarritz in March 1956, for standardization of the mathematical symbols for the most commonly used quantities. The basis for discussion was a review prepared by Gulland (1956, 1958); a system of notation was proposed, and provisionally accepted by the Commission at the 1956 Annual Meeting for use in its publications. After some deliberation, the 45th Statutory Meeting of the International Council for the Exploration of the Sea at Bergen in 1957 recommended the adoption by its member countries of the notation as finally amended. English is the basic language of the terminology but equivalents in German and Japanese were also accepted.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

FOOD SPOILAGE:
"The Effect of Several Antifungal Antibiotics on the Growth of Common Food Spoilage Fungi," by John B. Klis, Lloyd D. Witter, and Z. John Ordahl, article, Food Technology, vol. 13, February 1959, pp. 124-128, printed. Food Technology, The Garrard Press, 510 No. Hickory, Champaign, Ill.

FOOD TECHNOLOGY:
The Technology of Food Preservation, by Norman W. Desrosier, 431 pp., illus., printed. The Avi Publishing Co., Inc., Westport, Conn., 1959. A textbook which presents the elements of the technology of food preservation. It contains chapters on: food to preserve; acceptable food to eat; refrigerated storage of perishable commodities; food freezing; principles of food preservation by drying, canning, fermentation and pickling; and preservation of food as sugar concentrates, with chemical additives, and with ionizing radiation. Sections on fish cover canned fish, chemical preservation, cold storage, dehydration, and salting. A suggested reading list is presented at the end of each chapter which greatly expands each of the major subject areas. Also, an appendix contains a list of journals which cover the topics of the text.

FROZEN FOODS:
"Ultrasonic Defrosting of Frozen Foods," by A. L. Brody, article, Food Technology, vol. 13, February 1959, pp. 109-112, printed. Food Technology, The Garrard Press, 510 No. Hickory, Champaign, Ill.

GALVANOTAXIS:
"Die Galvanotaxis der Fische und ihre Auslosung auf Grund Unmittelbarger Irritabilität der Rumpfmuskulatur" (The Galvanotaxis of Fishes and its Release by Means of Direct Irritability of the Muscular System of the Body), by D. Spiecker, article, Zoologische Jahrbücher, Abt. 3, Allegemeine, Zoologie und Physiologie, vol. 67, no. 2, 1957, pp. 229-260, printed in German. Zoologische Jahrbucher, Abt. 3, Allegemeine Zoologie und Physiologie, Jena, Germany.

GENERAL:
The Fertilization of Fishery Waters, by K. I. Ananiadis, 4 pp., processed, translated from the Greek. (Reprinted from Alieia, vol. 12, no. 134, August 1958, pp. 41-42.) Not for general distribution; on deposit at the Central Library, Department of the Interior, Washington 25, D. C.

On the Nature of Production in the Sea, D. H. Cushing, Fishery Investigations, series 2, vol. 22, no. 6, 43 pp., illus., printed, 10 s. (US$1.40). Her Majesty's Stationery Office, York House, Kingsway, London W. C. 2, England, 1959.

GREAT LAKES:
Fishes of the Great Lakes Region, by Carl L. Hubbs and Karl F. Lagler, Bulletin No. 26, 269 pp., illus., printed. Cranbrook Institute of Science, Bloomfield Hills, Mich.

HERRING:
"The Content of Fat and Fat-Free Dry Matter in Winter Herring During the Years 1930-1956," by Einar Flood, article, Fiskeridirektoratets Skrifter Serie Teknologiske Undersökelser, vol. 3, no. 5, 1958, pp. 1-9, printed in Norwegian. Director of Fisheries, Bergen, Norway.

"Fatness of Small Herring in the Bay of Fundy," by A. H. Leim, article, Journal of the Fisheries Research Board of Canada, vol. 15, November 1958, pp. 1259-1267, printed. Journal of the Fisheries Research Board of Canada, Queen's Printer and Controller of Stationery, Ottawa, Canada.

Oil and Cattle Food from Herrings, by Severin Sirnes, U. S. Patent 2, 832, 684, April 29, 1958, printed. U. S. Patent Office, Washington 25, D. C.

Sildarrannsoknir AEGIS Sumarid 1954 (Herring Investigations with the Research Vessel Aegir in the Summer 1954), by Jon Jonsson and Unnsteinn Stefansson, Fjolrit Fiskideildar Nr. 5, 42 pp., illus., processed in Icelandic with English summary. The University Research Institute, Department of Fisheries, Reykjavik, Iceland, 1955.

IMPORTS:
United States Imports of Merchandise for Consumption (Commodity by Country of Origin), Calendar Year 1958, Report No. FT 110, 168 pp., processed, $1. Bureau of the Census, U. S. Department of Commerce, Washington, D. C., July 1959. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) The import statistics include government as well as nongovernment shipments of merchandise (including fish and shellfish and fishery byproducts) from foreign countries to the United States.

INDIA:
Fisheries of the West Coast of India, edited by Dr. S. Jones, 130 pp., illus., printed. Central Marine Fisheries Research Station, Mandapam Camp, India, 1958. Contains a collection of articles on the varied aspects of Indian fisheries.

INSECTICIDES:
"Comparative Effects of the Insecticides DDT and Malathon on Young Atlantic Salmon," by Miles H. A. Keenleyside, article, Progress Reports of the Atlantic Coast Stations, no. 69, 1958, pp. 3-6, printed. Fisheries Research Board of Canada, Atlantic Fisheries Experimental Station, Halifax, Nova Scotia, Canada.

ISRAEL:
An Annotated List of the Decapod Crustacea of the Mediterranean Coast of Israel, with an Appendix Listing the Decapoda of the Eastern Mediterranean, by L. B. Holthuis and E. Gottlieb, Bulletin No. 18, 129 pp., illus., printed. (Reprinted from Bulletin of the Research Council of Israel, vol. 7B, No. 1-2, pp. 1-126. State of Israel, Ministry of Agriculture, Division of Fisheries, The Sea Fisheries Research Station, Haifa, Israel.

JAPAN:
Annual Report on the Fish Resources in Oct. 1951-Sept. 1952--Section 4, Bottom Fish, 144 pp., illus., printed in Japanese. Tohoku Regional

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Fisheries Research Laboratory, Hachinohe Branch, Hachinohe Aomori Pref., Japan, March 1954.

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Fisheries in Japan, by Y. Suzuki, 105 pp., illus., processed. Ministry of Agriculture and Forestry, Tokyo, Japan, 1959. A comprehensive report with many tables, which discusses recent developments in fisheries activities, fisheries production, fishing vessels, apparatus and equipment, fishing vessels equipped with refrigerators, superchargers, movable pitch propellers, wireless telephones and telegraphs, fish finders, fishing lights, synthetic fiber fishing nets and ropes, fishing ports, Japanese fishery statistical areas, types of gear, processing of fishery products, cold-storage, consumption of fishery products in Japan, exports, marketing, transportation of fishery products, activities of cooperatives, fisheries credits, accident insurance, labor problems, current status of marine fisheries, status of whaling, seaweed production, and fresh-water fish culture.

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consist of a series of morning lectures (to be printed in book form shortly after the Congress) and concurrent afternoon seminars. This volume of summaries in English, with abstracts in a second language, follows the five general topics of the Congress--History of the Oceans, Populations of the Sea, The Deep Sea, Boundaries of the Sea, and Cycles of Organic and Inorganic Substances in the Sea.

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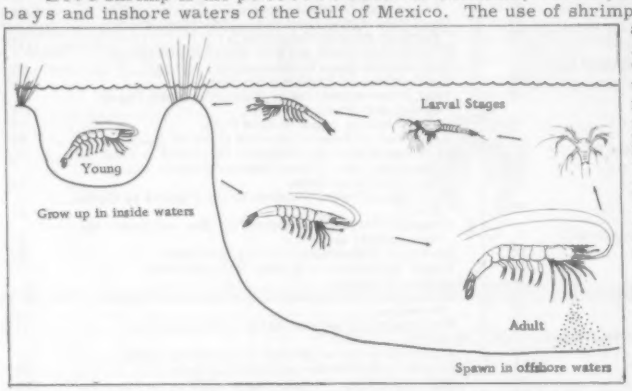
THE BAIT SHRIMP INDUSTRY OF THE GULF OF MEXICO

Fishery Leaflet 480, The Bait Shrimp Industry of the Gulf of Mexico, describes the fishing gear used by bait fishermen, the methods of operation, and the marketing practices in Texas and Florida. In other areas of the Gulf, marketing practices may differ considerably, but fishing gear methods of operation are similar.

Live shrimp is the preferred bait for sea trout, redfish, flounders and most game fish of the bays and inshore waters of the Gulf of Mexico. The use of shrimp for this purpose has given rise to a large bait industry in some areas. Approximately 39 million shrimp with a retail value of $500,000 were utilized by the bait industry in northeast Florida during a 12-month period in 1952-53. The bait catch on the west coast of Florida in 1955 amounted to almost 59 million shrimp with a retail value of nearly $2 million. In Galveston Bay, Tex., over 252,000 pounds of shrimp retailed at almost $292,000 from June 1957 through May 1958. It is apparent that catching shrimp for bait is an important industry in the Gulf States.



The bait fishery is based on three kinds of shrimp, also used as food: the white shrimp, the brown shrimp, and the pink shrimp. The kind that predominates varies according to locality and time of year.

On the northeast coast of Florida, the bait fishery north of New Smyrna is dependent on white shrimp, and that from New Smyrna to Fort Pierce is based on brown and pink shrimp. On the west coast of Florida from Cedar Key to Naples, the catch is chiefly pink shrimp.

In Galveston Bay on the Texas coast, brown shrimp dominate the bait catch from May through the middle of July, white shrimp from August through April. Pink shrimp occur infrequently.

Other shrimp that occasionally enter the bait fishery include the sea bob and the broken-neck shrimp. In some areas, after periods of heavy rainfall, fresh-water river shrimp enter the bays and are utilized by the bait fishery. Several species of grass shrimp are numerous along the marshes of inshore waters and are commonly mistaken for the young of commercial varieties of shrimp. Although grass shrimp are very hardy, they seldom exceed 2 inches in total length, and are not used to any extent by the bait fishery.

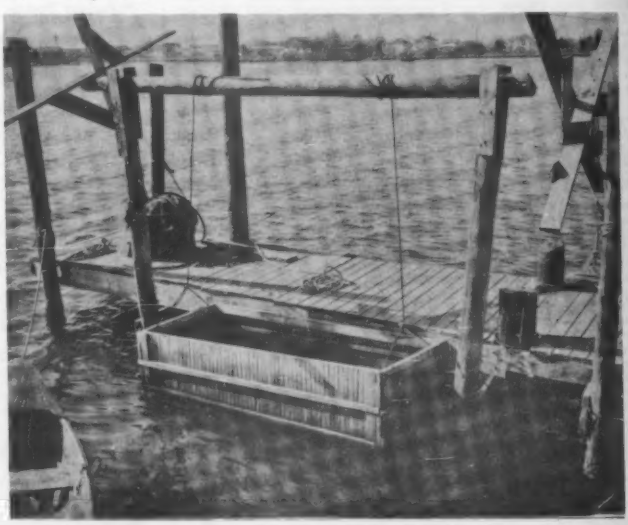


Fig. 1 - Holding pen made from cypress slats of perforated fiberboard and is suspended in the water. Water exchange is by means of natural currents and tidal movements. The pens can be raised by a simple but effective winch arrangement.